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PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.,
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Airline	WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5017A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5117A, WG-5118A, Tel. Rec. Prod. Chg. Bul. 173	340-1
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General Electric — 21C700- 21C701-21T500,
Coronado — TV1-9404A-9406A-9407A-
9408A-9409A-9410A-9411A

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[illegible] GRADE ST.
DE[illegible], COLORADO

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 313

AIRLINE MODELS WG-4011A, WG-4011B, WG-4012A, WG-4012B, WG-4111A, WG-4111B, WG-4111C, WG-4112A, WG-4112B, WG-4112C, WG-5011A, WG-5011B, WG-5014A, WG-5014B, WG-5016A, WG-5017A, WG-5018A, WG-5111A, WG-5111B, WG-5111C, WG-5114A, WG-5114B, WG-5114C, WG-5116A, WG-5118A

Airline Models WG-4011A, WG-4011B, WG-4012A, WG-4012B, WG-4111A, WG-4111B, WG-4111C, WG-4112A, WG-4112B, WG-4112C, WG-5011A, WG-5011B, WG-5014A, WG-5014B, WG-5016A, WG-5017A, WG-5018A, WG-5111A, WG-5111B, WG-5111C, WG-5114A, WG-5114B, WG-5114C, WG-5116A, WG-5118A (Code 21A59CT) were covered in Photofact Folder 2 – Set 313.

Models WG-5017A and WG-5117A are added, along with late production changes, with the publication of this bulletin.

TO IMPROVE VERTICAL STABILITY

C2A, C2B, C2C is changed to part #45X431. The value of C2C has been decreased from 100MFD @ 50V to 20MFD @ 50V.

TO IMPROVE VERTICAL LINEARITY

R60 is decreased from 1Meg to 470K.

A 100Ω resistor is added from pin 8 of V11 to the junction of C2C and R64.

TO PREVENT PARASITIC OSCILLATION IN HORIZONTAL OUTPUT CIRCUIT

A 1000MMF @ 500V ceramic disc capacitor is added from pin 4 of V13 to ground.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 11 IN SET 321

PHILCO CHASSIS TV-390, TV-392

Philco Models 22D4034, 22D4034L, 22D4134, 22D4134L, 22D4140, 22D4140L, 22D4151, 22D4151L, 22D4152, 22D4152HM, 22D4152M, 22D4157, 22D4160XL and 22D4160X (Ch. TV-390), 22D4041, 22D4041L, 22D4144, 22D4144L, 22D4145, 22D4156, 22D4156L, 22D4159, 22D4160, 22D4160L, 22D4161, 22D4161L, 22D4165, 22D4324HM, 22D4324M, 22D4326, 22D4420, 22D4420L and 22D4422 (Ch. TV-392) were covered in Photofact Folder 11 – Set 321.

The following changes were made during late production.

Run 8

TO IMPROVE VERTICAL SYNC

R27 is increased from 1Meg to 1.5Meg.

R28 is increased from 5.6Meg to 6.2Meg.

R29 is omitted.

R31 is decreased from 6.8Meg to 5.6Meg.

R33 is increased from 220K to 390K.

A 10Meg resistor is added from the junction of R70 and R71 to terminal 9 of M7, range switch.

R32 is increased from 2.2Meg to 4.7Meg.

Run 9

COMPONENT CHANGE

R110 is increased from 100K to 470K.

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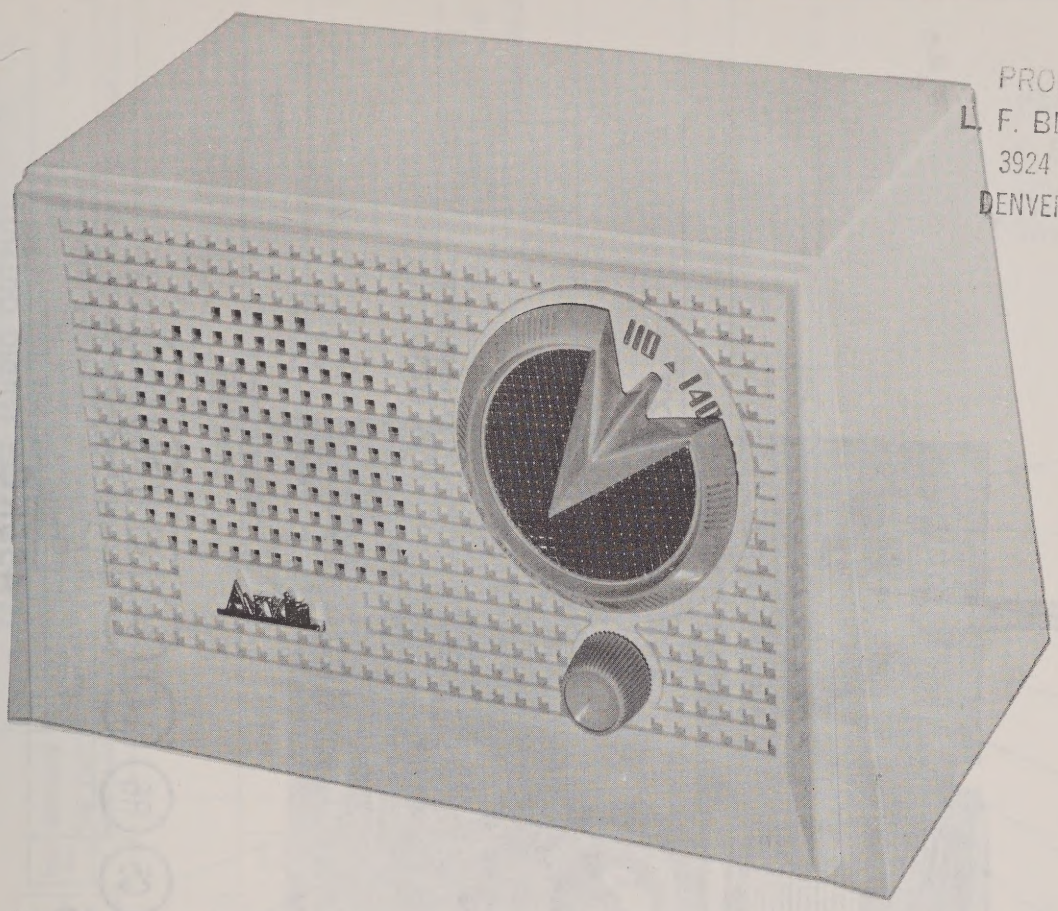
DENVER, COLORADO

ARVIN
MODELS 950T1, 951T1



ARVIN
MODELS 950T1, 951T1

TRADE NAME	Arvin Models 950T1, 951T1
MANUFACTURER	Arvin Industries, Inc., Columbus, Ind.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"
4.		"	600KC	Tune to 600KC signal	"	A7	Adjust for maximum output while rocking tuning gang.

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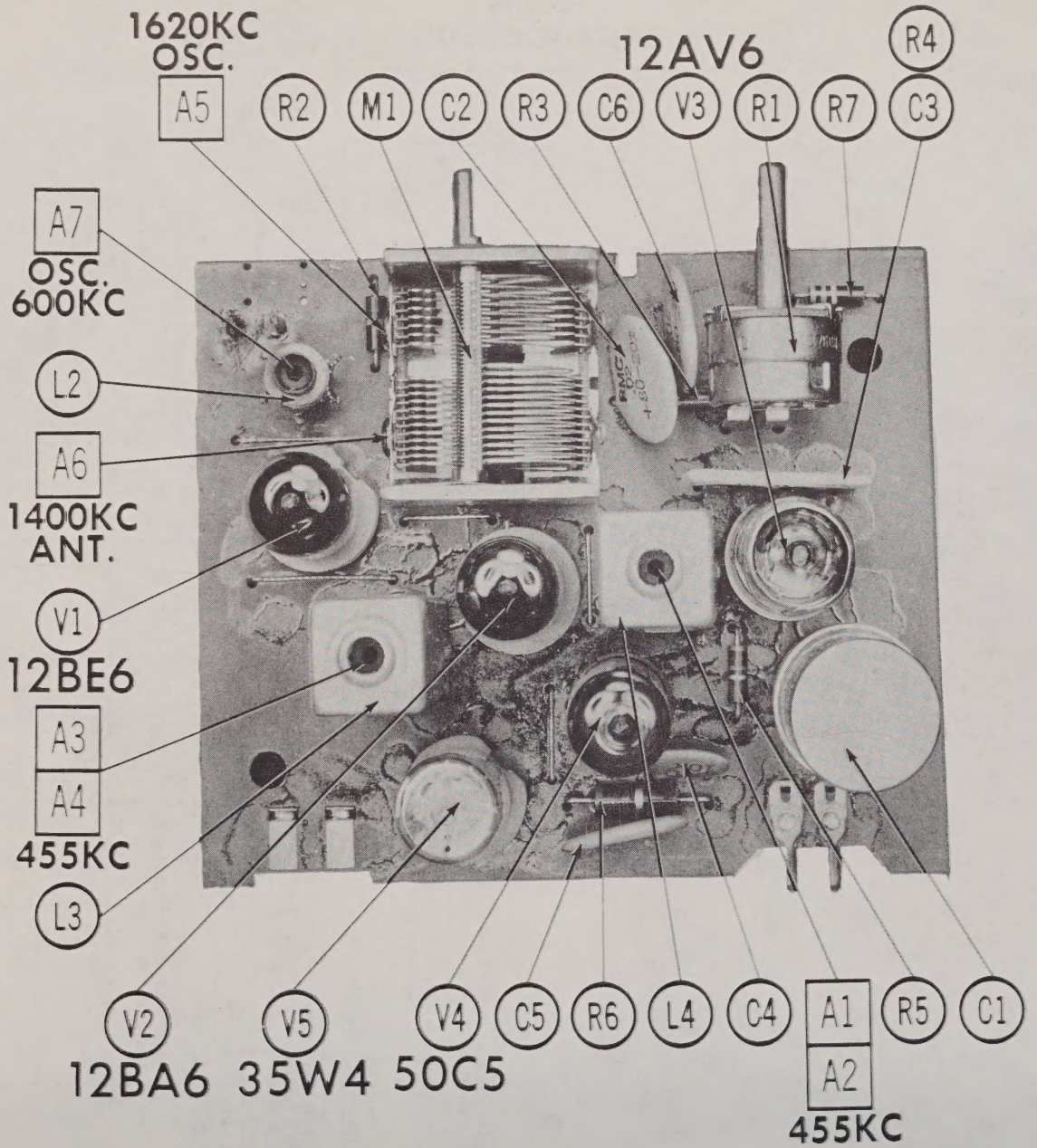

CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amplifier	12AT6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	43672	AFH2-15	B0150	FP213	TMD-12	D-065	TVL-2432
B	▲30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	20000		43674-2	BPD-02	DF-203	K085	817-02		5HK-S2	
C3A	220		†43743-1	†PA-458	†PCT-158				†DT-5	
B	2000									
C	5000									
D	250									
E										
C4	10000		43674-1	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C5	20000		43674-2	BPD-02	DD-203	K085	817-02		5HK-S2	
C6	20000		43674-2	BPD-02	DD-203	K085	817-02		5HK-S2	

† Items C3A, C3B, C3C, C3D, C3E, R4A, R4B, R4C are combined in one unit. When replacing items separately, C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	C43671	B-60-S	A47-500K-Z	Q13-133	U48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-12	76-1	US-26	Attach to R1A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ARVIN PART No.	IRC PART No.	NOTES
R2	22K		43687-223	BTS-22K	
R3	2.2Meg		43687-225	BTS-2.2Meg	
R4A	6.8Meg		†43743-1	BTS-6.8Meg	
B	470K			BTS-470K	
C	470K			BTS-470K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ARVIN PART No.	IRC PART No.	NOTES
R5	120Ω	1	43689-121	BTS-120	
R6	1200Ω		43688-122	BTA-1200	
R7	330K		43687-334	BTS-330K	

† Items R4A, R4B, R4C, C3A, C3B, C3C, C3D, C3E are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ARVIN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2400Ω	3-4Ω	Part of Spkr. C43096	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA ARVIN PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"	PM	3-4Ω	C43096	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ARVIN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	2.9Ω		43726-1				Includes cabinet back
L2	Osc. Coil	.4Ω	5.3Ω	43644-1				
L3	Input IF	16Ω	16Ω	43669-2				
L4	Output IF	16Ω	16Ω	43669-2				

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M1	Tuning Cap.	43987	2 Gang
	Cabinet	43723-1	Brown
	Cabinet	43723-2	Ivory
	Knob	43654-2	Tuning, Ivory
	Knob	43653-2	On-off-volume, Ivory

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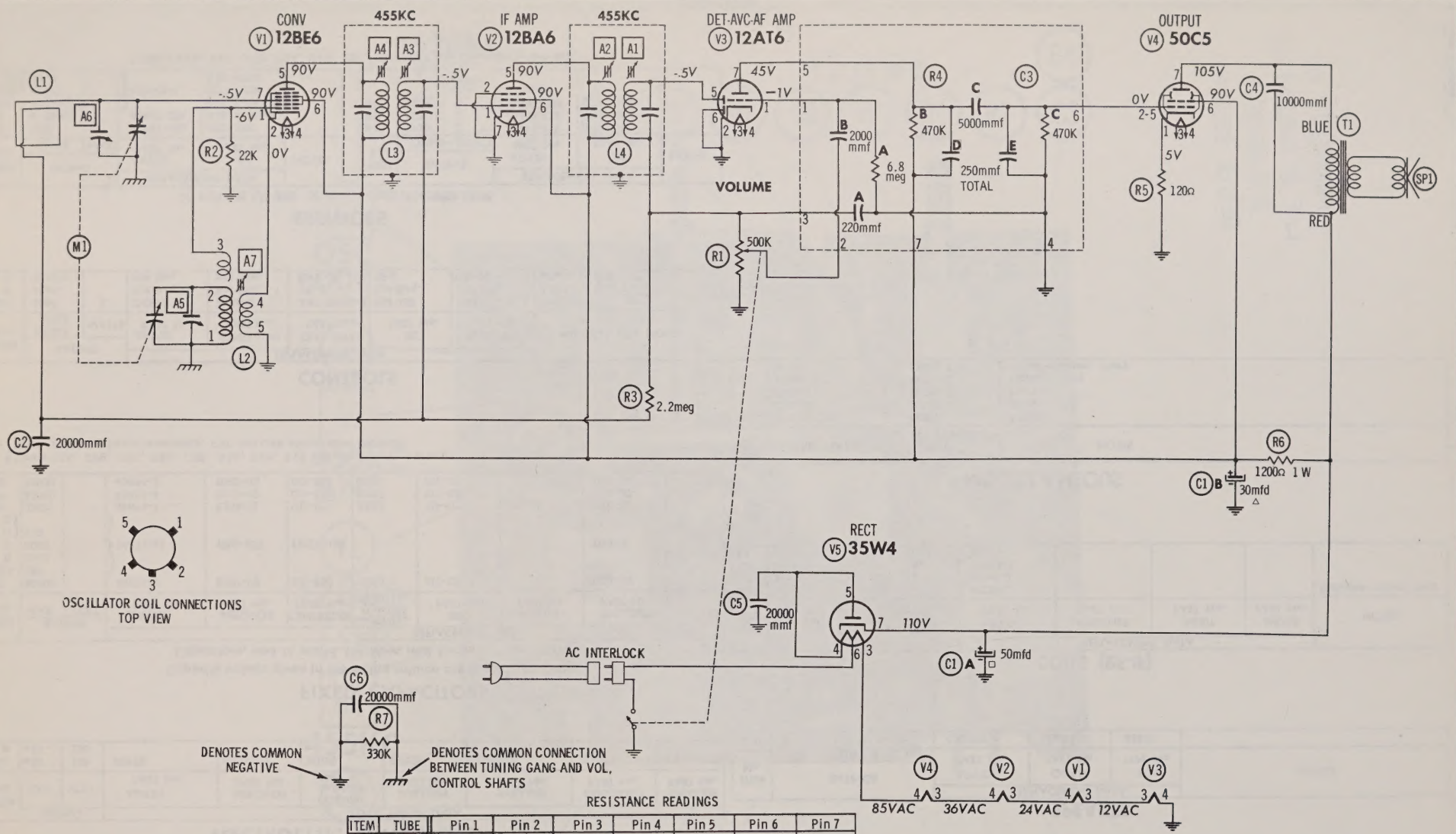
ARVIN MODEL 950TI



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.4Ω	12Ω	24Ω	†1200Ω	†1200Ω	2.7Meg
V2	12BA6	2.7Meg	0Ω	24Ω	36Ω	†1200Ω	†1200Ω	0Ω
V3	12AT6	6.8Meg	0Ω	12Ω	0Ω	500K	0Ω	†470K
V4	50C5	120Ω	470K	36Ω	85Ω	470K	†1200Ω	†175Ω
V5	35W4	NC	NC	85Ω	110Ω	110Ω	105Ω	50K

† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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RETMA MEMBER

CAPEHART
MODEL 75C56 (Ch. CR-242)

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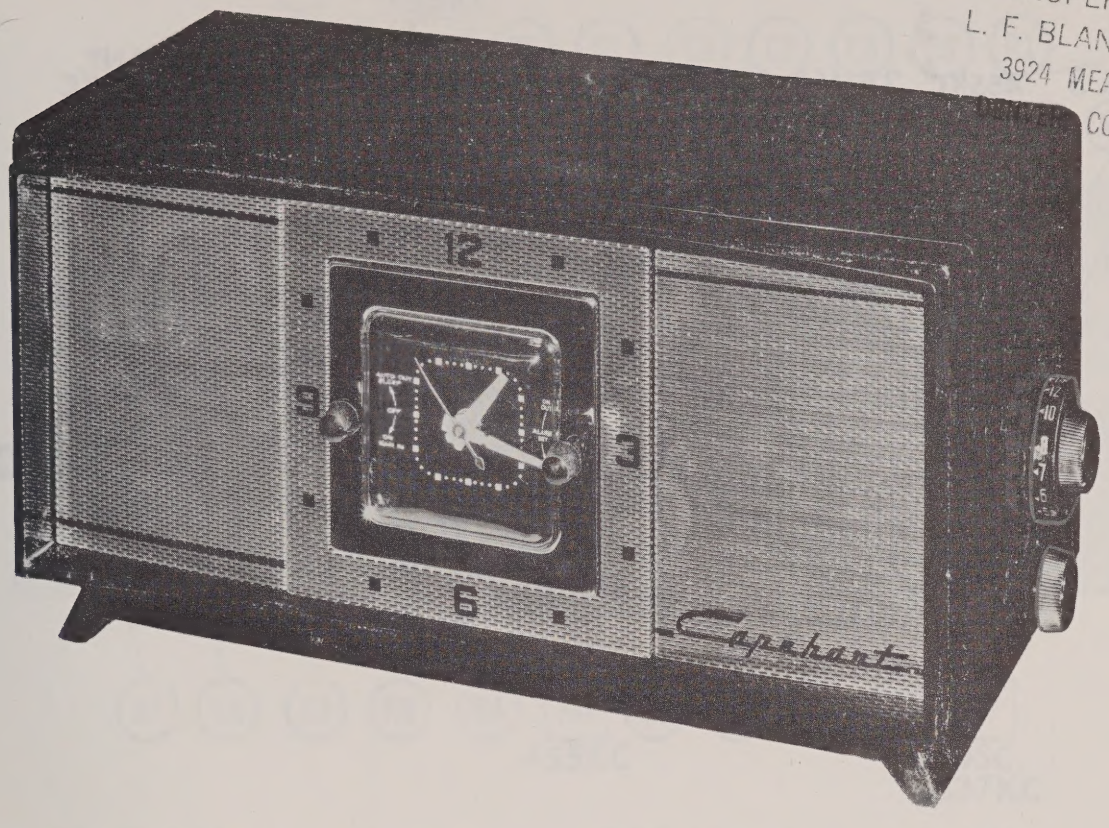
3924 MEADE St.
COLORADO

CAPEHART
MODEL 75C56 (Ch. CR-242)



CAPEHART
MODEL 75C56 (Ch. CR-242)

TRADE NAME	Capehart Model 75C56 (Ch. CR-242)
MANUFACTURER	Capehart-Farnsworth Corp., Fort Wayne 1, Ind.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC	Tuning gang fully open	Across voice coil	A1, A2 A3, A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1620KC	"	"	A5	"
3.		"	1500KC	Tune to 1500KC signal	"	A6	"
4.		"	537KC	Tune to 537KC signal	"	A7	"

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PARTS LIST AND DESCRIPTIONS

CAPEHART
MODEL 75C56 (Ch. CR-242)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amplifier	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA CAPEHART PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	650326A-1	PRS150V5050	BBRD5515	TCD49	TDLD-9	FMD-1550	TVA-2453
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CAPEHART PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	470		2239-013	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C2	56		2241-554	SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	
C4	.047	200	2246-4730	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C5A	220									
B	2000									
C	5000		♦452244A-2	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦DT-1	
D	250									
E										
C6	.01	600	2248-1030	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C7	.022	600	2248-2230	BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C8	.1	600	2248-1040	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	

♦ Items C5A, C5B, C5C, C5D, C5E, R6A, R6B and R6C are combined in one unit.
When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CAPEHART PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	750266A-19	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

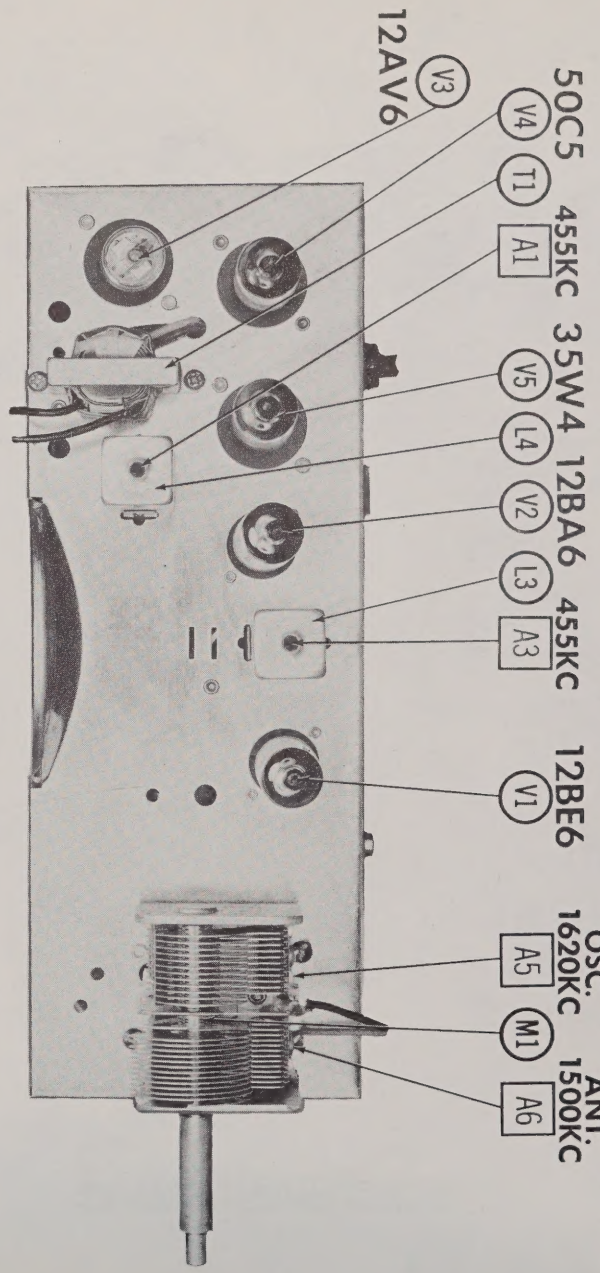
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CAPEHART PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	22K		3229-223	BTS-22K	
R3	1Meg		3230-105	BTS-1Meg	
R4	82Ω		3229-820	BTS-82	
R5	3.3Meg		3230-335	BTS-3.3Meg	
R6A	6.8Meg			BTS-6.8Meg	
B	470K		♦452244A-2	BTS-470K	
C	470K			BTS-470K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CAPEHART PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R7	150Ω		3229-151	BTS-150	
R8	1500Ω	1	3232-152	BTA-1500	
R9	220K		3230-224	BTS-220K	

♦ Items R6A, R6B, R6C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CAPEHART PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	65118IA-1	Z1103 ①	A-3031 ①	A-3336 ①	24S50A ①	S-16X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CAPEHART PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	750792A-1	4A07	223S1	

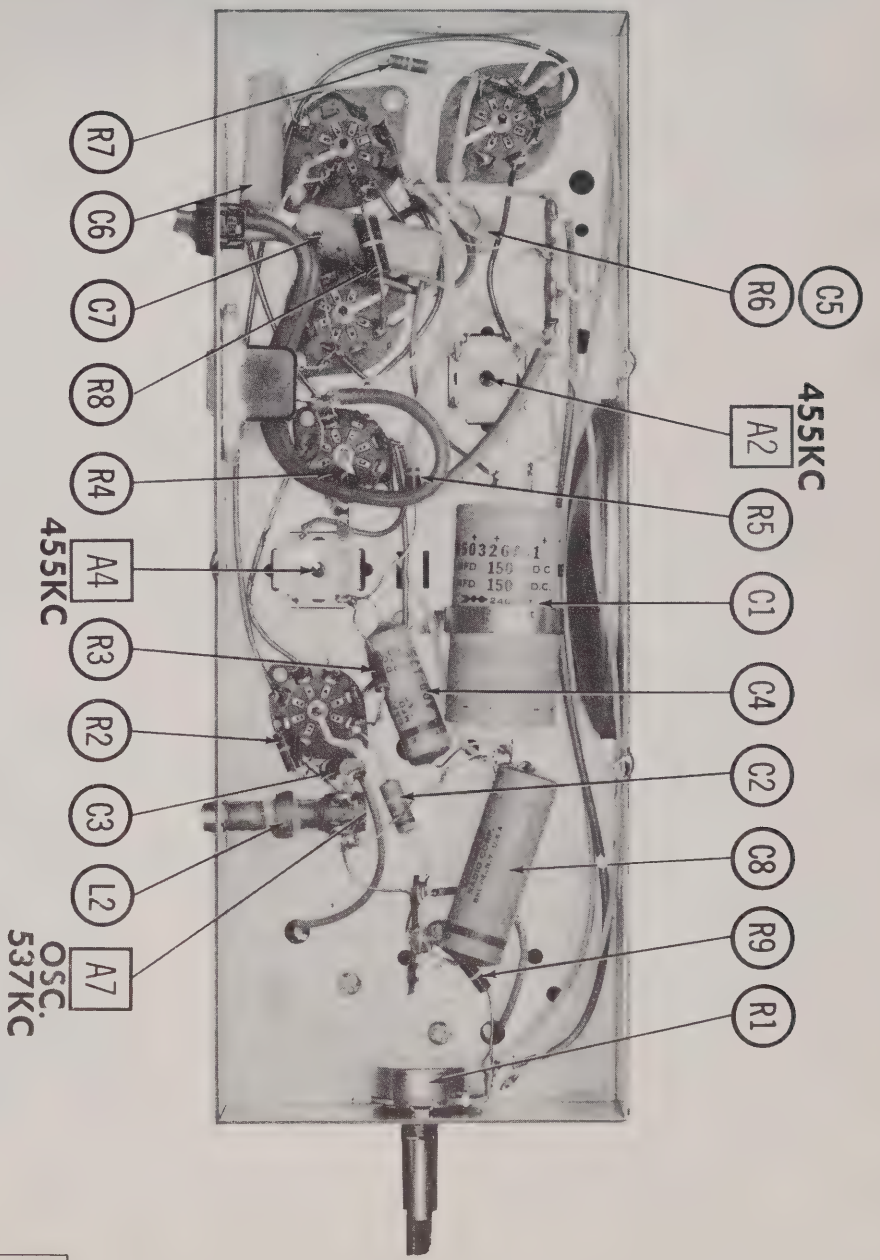
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CAPEHART PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.9Ω		750787A-1				
L2	Osc. Coil	.3Ω	4.5Ω	452242C-1	14-1060	BC-387	70-OSC	
L3	Input IF	13Ω	13Ω	452243A-2	16-6758	BC-352	12-C1	
L4	Output IF	13Ω	13Ω	452243A-2	16-6758	BC-353	12-C2	

MISCELLANEOUS

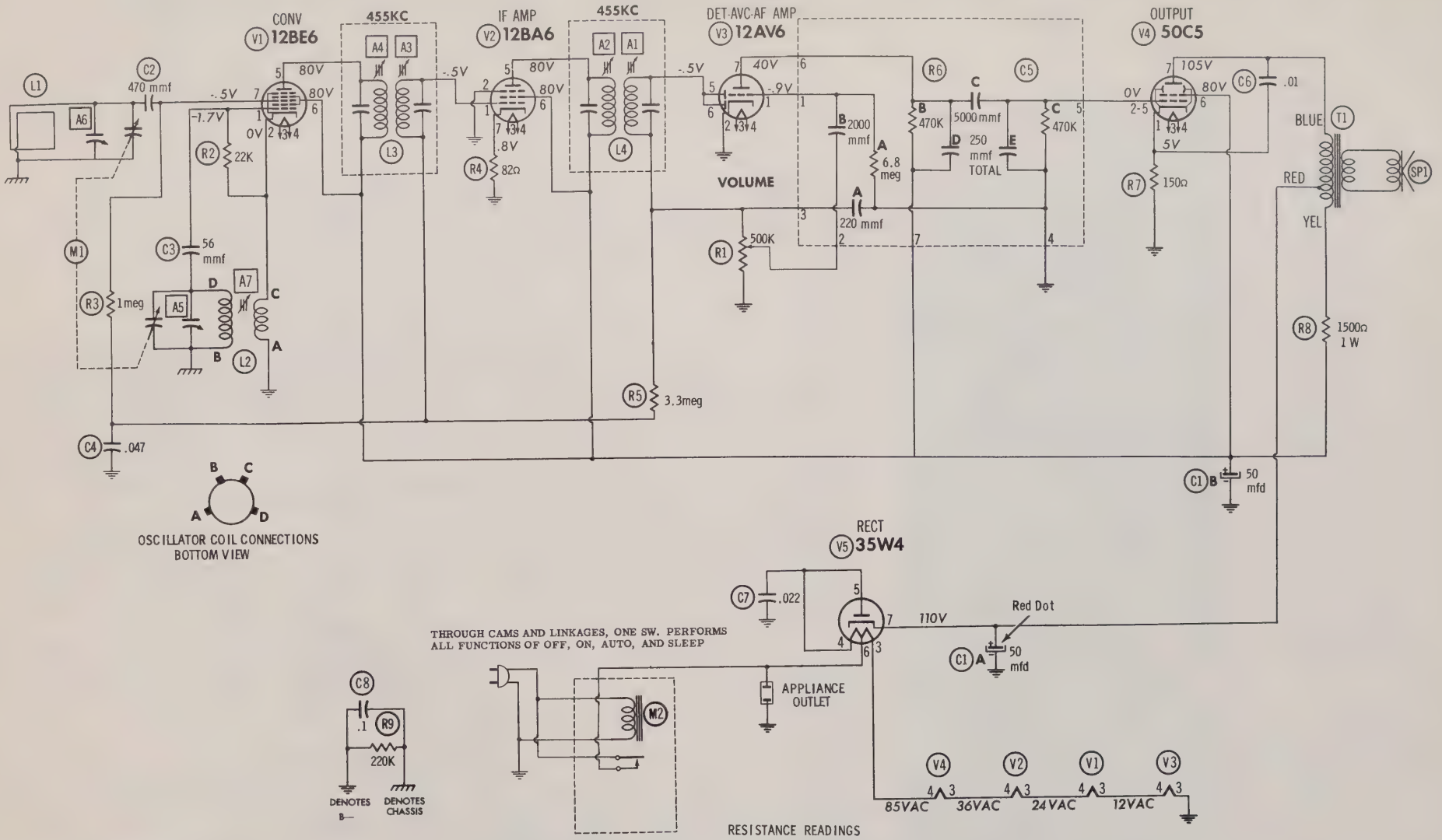
ITEM No.	PART NAME	CAPEHART PART No.	NOTES
M1	Tuning Cap.	650327A-2	2 Gang (28-465MMF, 22-165MMF)
M2	Clock	750813B-1	
	Cabinet	950353B-1	Ebony
	Cabinet	950353B-2	Red
	Knob	650325A-16	Dial (Ebony)
	Knob	650325A-13	Dial (Red)
	Knob	452240A-5	Volume & tuning (Ebony)
	Knob	452240A-12	Volume & tuning (red)

CHASSIS—BOTTOM VIEW



CAPEHART
MODEL 75C56 (Ch. CR-242)

CAPEHART
MODEL 75C56 (Ch. CR-242)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.3Ω	12Ω	24Ω	†1500Ω	†1500Ω	4.8Meg
V2	12BA6	3.8Meg	0Ω	24Ω	36Ω	†1500Ω	†1500Ω	82Ω
V3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500K	500K	†470K
V4	50C5	150Ω	NC	36Ω	86Ω	470K	†1500Ω	†230Ω
V5	35W4	TP	NC	86Ω	115Ω	115Ω	113Ω	20K

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.
TP TIE POINT.

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L. F. BLANKENSHIP
3924 MEADE ST.

CBS-COLUMBIA
MODEL 5440

CBS-COLUMBIA
MODEL 5440

TRADE NAME	CBS-Columbia Model 5440
MANUFACTURER	CBS-Columbia, Div. Of Columbia Broadcasting System, Inc., 48-50 34th St., Long Island City, N. Y.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.21 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

CBS-COLUMBIA
MODEL 5440

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CBS-Columbia PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	70	150	21001091	PRS150V4080	BBRD8415	TCD498	TDLD-11	FMT-1540	TVA-3451
B	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CBS-Columbia PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	220			SI220	D6-221	TP38	811-221	UC-5322	5GA-T22	
C3	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C4	220			SI-220	D6-221	TP38	811-221	UC-5322	5GA-T22	
C5	.01	400		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C6A	10000									
B	250		† 8200041	† PA-112-3	† PC-80	† 113TM1	† 1404-01		† T-1	
C										
C7	.022	200		BPD-02	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C8	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

† Items C6A, C6B, C6C, R7A, and R7B are combined in one unit. When replacing items separately, C6B and C6C should total 250 MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CBS-Columbia PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	36000282	AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

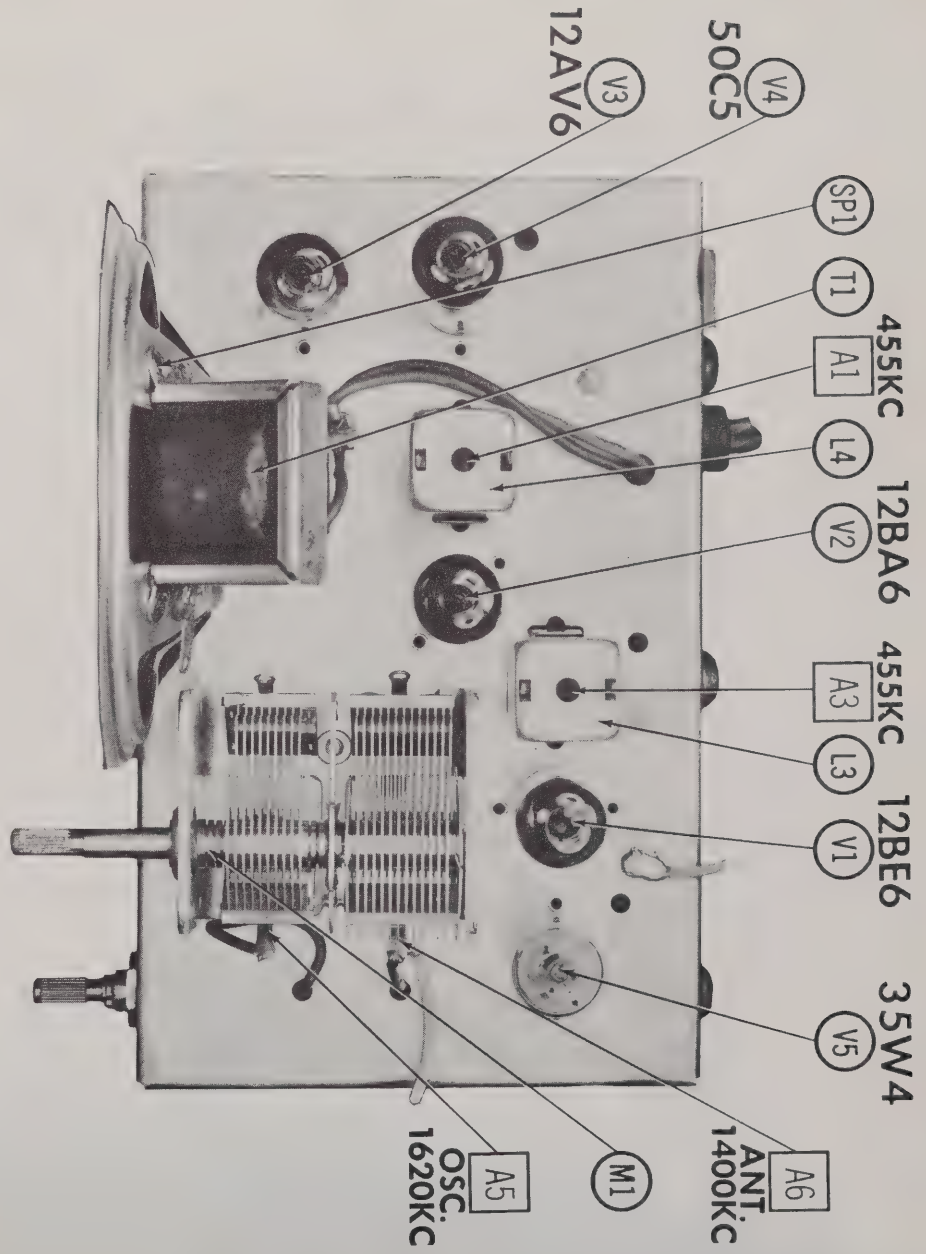
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CBS-Columbia PART No.	IRC PART No.	
R2	1Meg		30105230	BTS-1Meg	
R3	22K		30223230	BTS-22K	
R4	150Ω		30151230	BTS-150	
R5	3.3Meg		30335230	BTS-3.3Meg	
R6	4.7Meg		30475230	BTS-4.7Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CBS-Columbia PART No.	IRC PART No.	
R7A	500K		† 82000041	BTS-470K	
B	500K			BTS-470K	
R8	150Ω		30151230	BTS-150	
R9	2200Ω	2	30222250	BTB-2200	
R10	33Ω		30330230	BTS-33	

† Items R7A, R7B, C6A, C6B, C6C are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CBS-Columbia PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2100Ω	3-4Ω	Part of Spkr. 73000102	Z1101	A-3025	A3332	26S58	S-12X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CBS-Columbia PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	73000102	4A07	223S1	

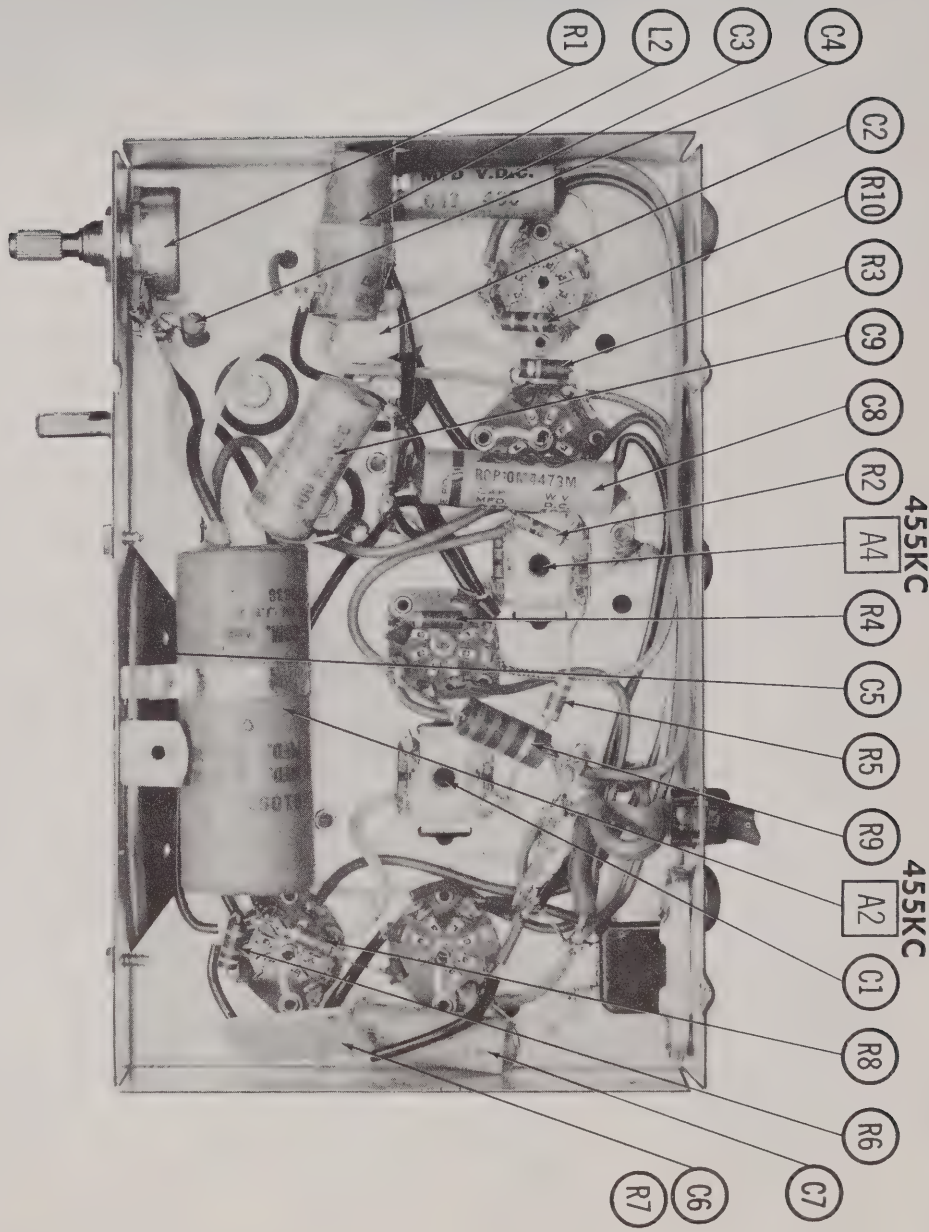
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CBS-Columbia PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3Ω		79000041				
L2	Osc. Coil	.9Ω	9Ω	15000092				
L3	Input IF	18Ω	18Ω	12000281	16-6758	BC-352	12-C1	
L4	Output IF	18Ω	18Ω	12000281	16-6758	BC-353	12-C2	

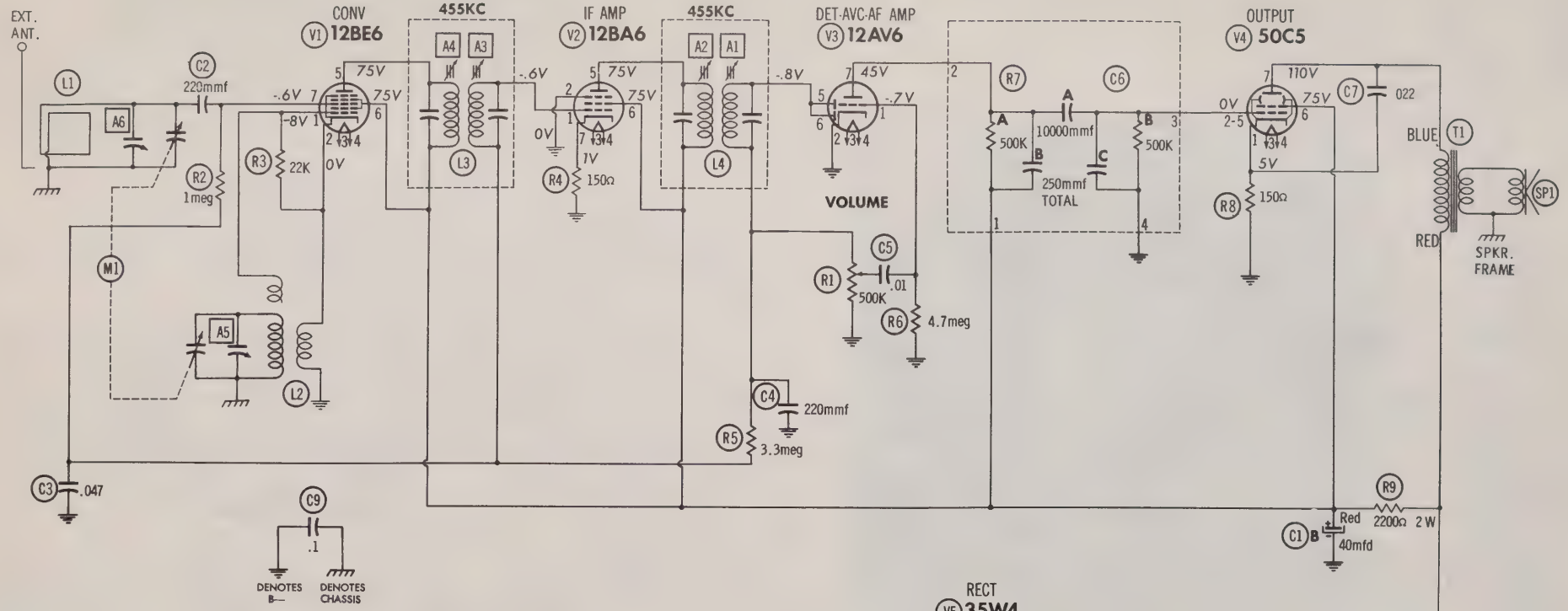
MISCELLANEOUS

ITEM No.	PART NAME	CBS-Columbia PART No.	NOTES
M1	Tuning Cap.	24000221	2 Gang (26-440MMF, 20-185MMF)
M2	Clock	76003641	
	Cabinet	70002381	Ebony
	Cabinet	70002382	Maroon
	Cabinet	70002383	Sand
	Cabinet	70002384	Ivory
	Knob	76000694	Volume
	Knob	76003651	Tuning

CHASSIS—BOTTOM VIEW



CBS-COLUMBIA MODEL 5440



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1Ω	24Ω	12Ω	†2200Ω	†2200Ω	4.8Meg
V2	12BA6	3.8Meg	0Ω	24Ω	36Ω	†2200Ω	†2200Ω	150Ω
V3	12AV6	4.7Meg	0Ω	0Ω	12Ω	500K	500K	†500K
V4	50C5	150Ω	500K	36Ω	86Ω	500K	†2200Ω	†250Ω
V5	35W4	TP	TP	86Ω	120Ω	120Ω	115Ω	15K

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP

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CROSLEY MODELS JC-8BK, BN, TN, WE (Ch. R-104)

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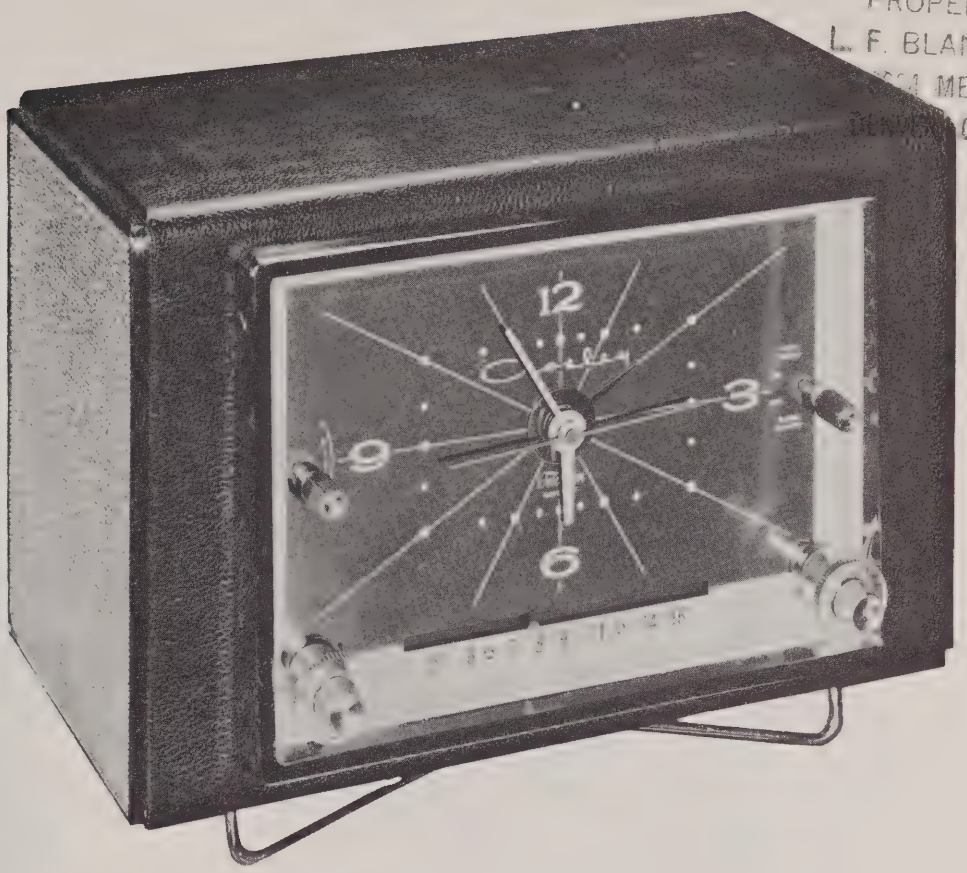
CROSLEY MODELS JC-8BK, BN, TN, WE (Ch. R-104)



CROSLEY MODELS JC-8BK, BN, TN, WE (Ch. R-104)

TRADE NAME	Crosley Models JC-8BK, JC-8BN, JC-8TN, JC-8WE (Ch. R104)
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	220MMF	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Disconnect loop. Connect 33K resistor from pin 7 (grid) of 12BE6 (V1) to B. Adjust for maximum output.
2.		Loop	1620KC	"	"	A5	"
3.		"	1400KC	Tune to 1400KC signal	"	A6	Remove 33K resistor. Reconnect loop. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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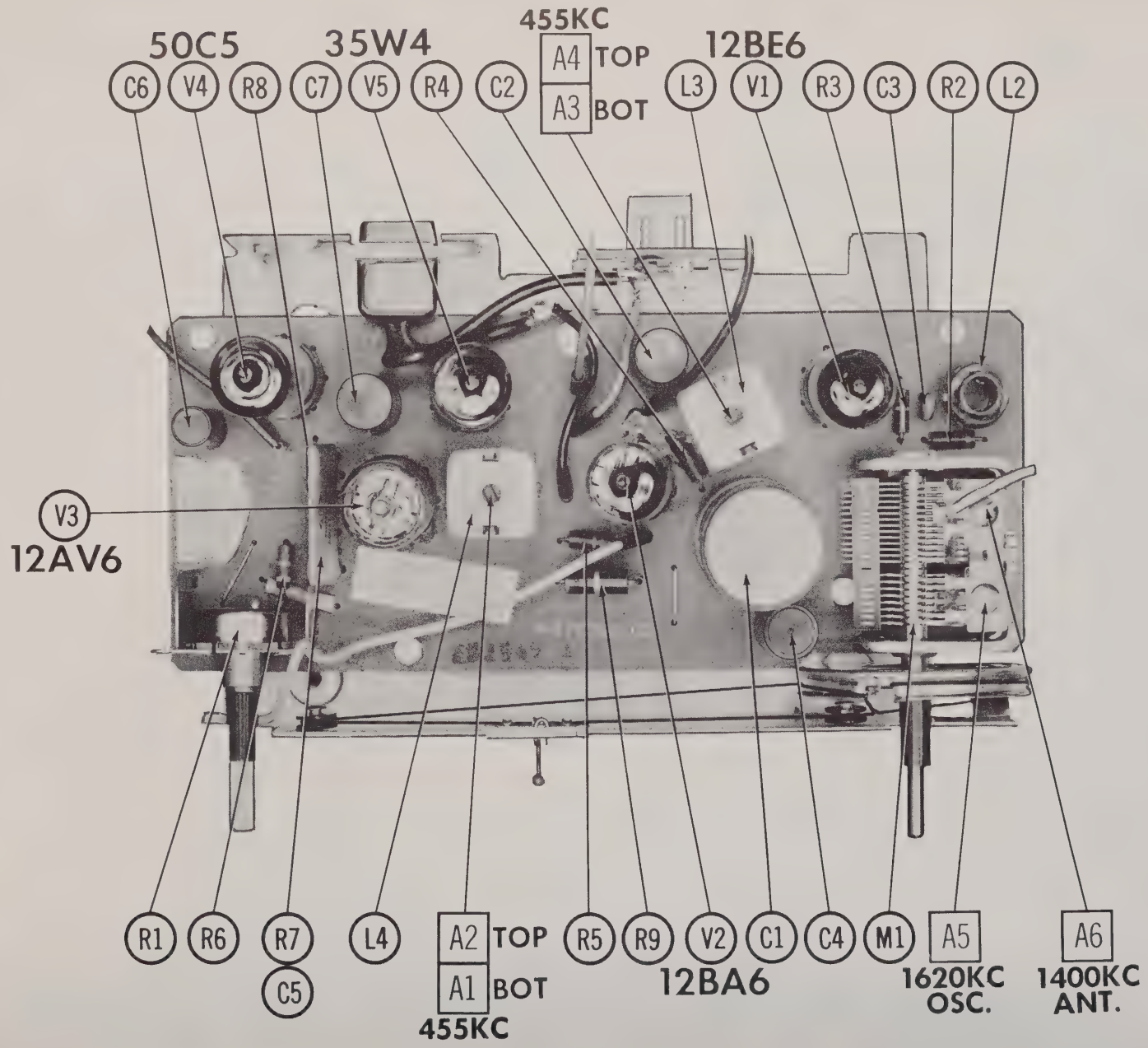


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amplifier	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	171371-1	AFH2-19	XB0181	FP216	TMD-16	D-085	TVL-2435
B	▲70	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.068	200	159505-5						2SE-S68	
C3	39		170194-4	NP0-DI39	TCZ-39	Z031	NP0L-390		5TCC-Q39	
C4	.068	400	159505-5						4SE-S68	
C5A	220		†158110-2	†PA-512	†PC-158				†DT-5	
B	5000									
C	5000									
D	250									
E										
C6	.0047	200	159505-6	BPD-0047	DD-472	K079	811-0047	PTS4247	2SE-D47	
C7	.047	200	159505-2	BPD-05				PTS4147	2SE-S47	

† Items C5A, C5B, C5C, C5D, C5E, R7A, R7B and R7C are combined in one unit. When replacing items separately C5D, and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K	½	B170802-1-1					Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	10Ω		39374-1	BTS-10	
R3	22K		39374-41	BTS-22K	
R4	2.2Meg		39374-69	BTS-2.2Meg	
R5	68Ω		39374-11	BTS-68	
R6	47K		39375-89	BTS-47K	
R7A	6.8Meg		†158110-2	BTS-6.8Meg	
B	470K			BTS-470K	
C	470K			BTS-470K	
R8	150Ω		39374-15	BTS-150	
R9	1000Ω	1	39374-113	BTA-1000	

† Items R7A, R7B, R7C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA CROSLEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2500Ω	3-4Ω	B-170940-1-3	Z1103 ①	A-3031 ①	A-3330 ①	24S50A ①	S-16X ①	① Bend ears down to fit.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA CROSLEY PART No.	REPLACEMENT DATA QUAM PART No.	REPLACEMENT DATA RCA TYPE No.	NOTES
SP1	4"	PM	3-4Ω	170797-3	4A07	223S1	
SP2	4"	PM	3-4Ω	158327-3	4A07	223S1	

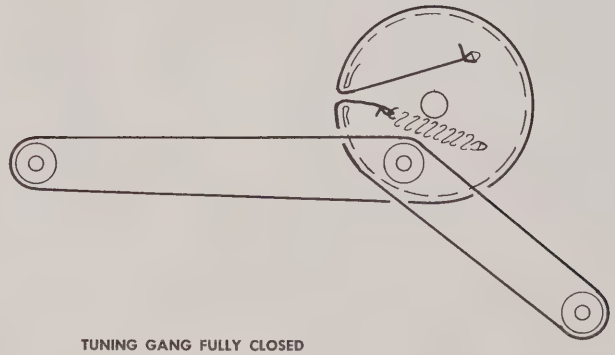
COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	REPLACEMENT DATA MEISSNER PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA MILLER PART No.	NOTES
L1	Loop Ant.	3.3Ω		(Note 1)				Includes cabinet back
L2	Osc. Coil	.7Ω	10.5Ω	159517-1				
L3	Input IF	16Ω	16Ω	170358-1				
L4	Output IF	10Ω	10Ω	170358-2				

Note 1. Part #170843-1 used in Model JC-8WE.
Part #170843-2 used in Model JC-8BN.
Part #170843-3 used in Model JC-8BK.
Part #170843-4 used in Model JC-8TN.

MISCELLANEOUS

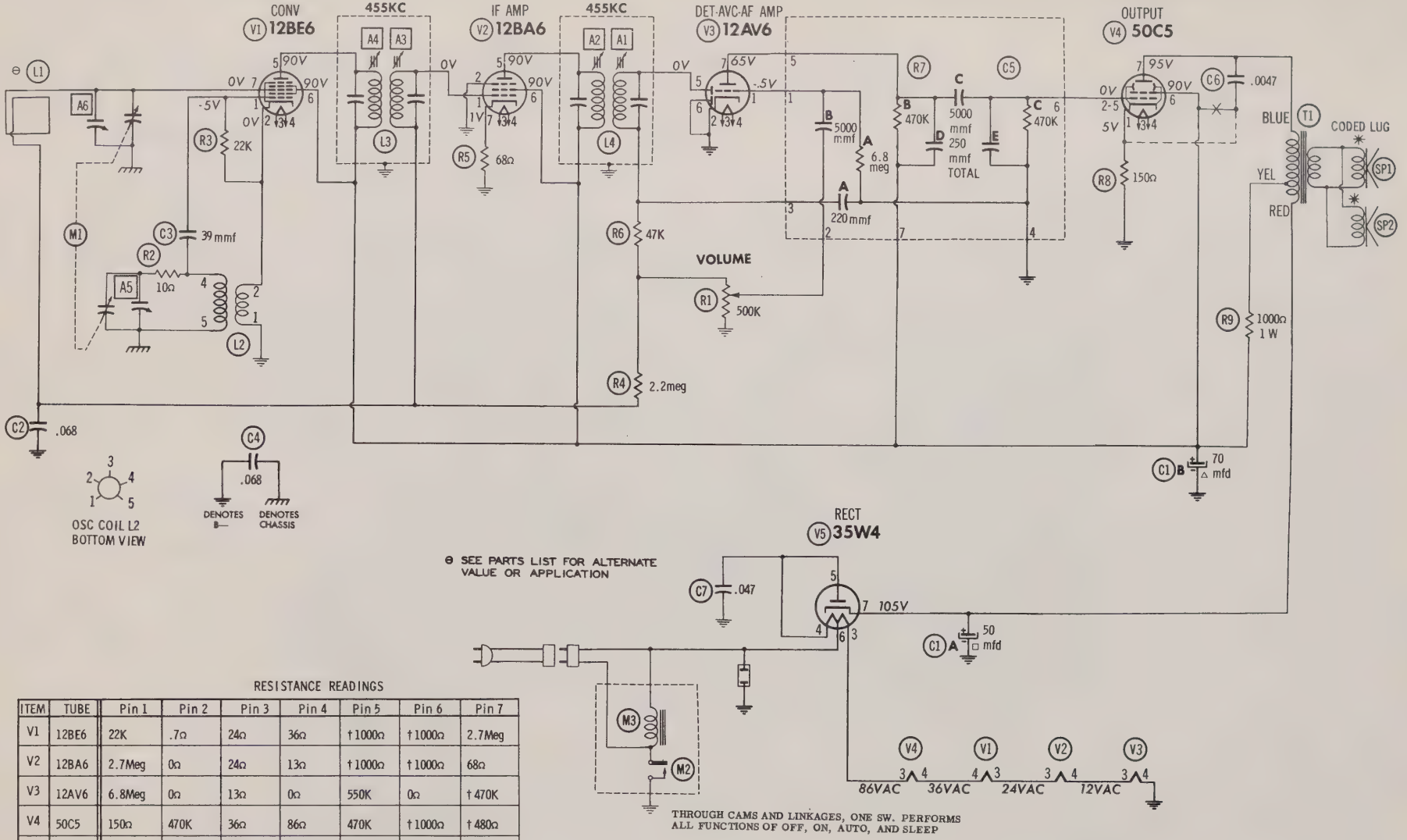
ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M1	Tuning Cap.	170801-1	2 Gang
M2	Switch	151389-26	On-off (part of M3)
M3	Clock Assy.	170620-1	Complete
	Cabinet & Leg Assy.	171959-1	Model JC-8WE
	Cabinet & Leg Assy.	171959-2	Model JC-8BN
	Cabinet & Leg Assy.	171959-3	Model JC-8BK
	Cabinet & Leg Assy.	171959-4	Model JC-8TN
	Knob	170826-1	Volume
	Knob	170826-2	Tuning
	Knob	170767-1	Clock (2 used)
	Hand	151389-34	Clock (Alarm set - gold)
	Hand	151389-35	Clock (hour and minute)
	Hand	151389-36	Clock (sweep second - red)
	Hand	151389-25	Clock (time set)
	Dial Pointer	170936-1	



TUNING GANG FULLY CLOSED

DIAL CORD STRINGING

CROSLEY MODEL JC-8BK (Ch. R104)



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.7Ω	24Ω	36Ω	†1000Ω	†1000Ω	2.7Meg
V2	12BA6	2.7Meg	0Ω	24Ω	13Ω	†1000Ω	†1000Ω	68Ω
V3	12AV6	6.8Meg	0Ω	13Ω	0Ω	550K	0Ω	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1000Ω	†480Ω
V5	35W4	NC	NC	86Ω	120Ω	12Ω	117Ω	20K

† MEASURED FROM PIN 7 OF V5.
ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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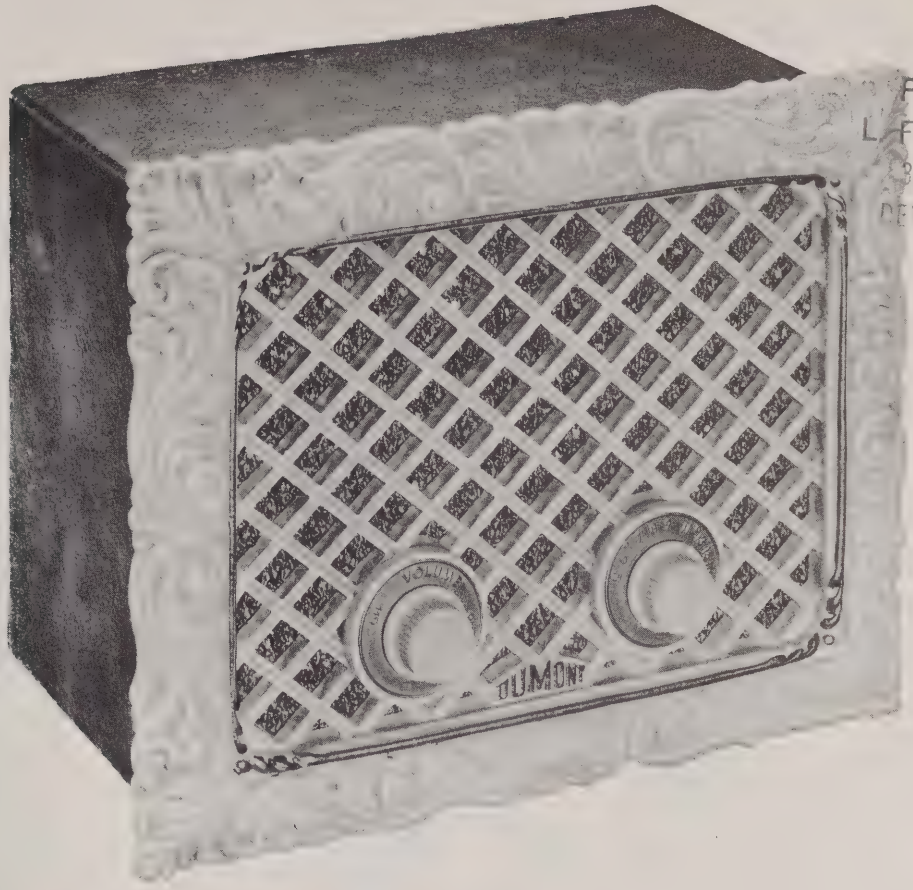

DUMONT
CHASSIS RA-346, -A4, -A5

DUMONT
CHASSIS RA-346, -A4, -A5

TRADE NAME	Dumont Chassis RA-346, RA-346-A4, RA-346-A5
MANUFACTURER	Allen B. Dumont Laboratories, Inc., 2 Main St., Passaic, N.J.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver (Chassis RA-346-A4, -A5 are clock versions)
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC (AC-60 Cycles Only For Clock Versions) RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1640KC	"	"	A5	"
3.			"	"	"	A6	"
4.		"	540KC	Tuning gang fully closed	"	A7	"

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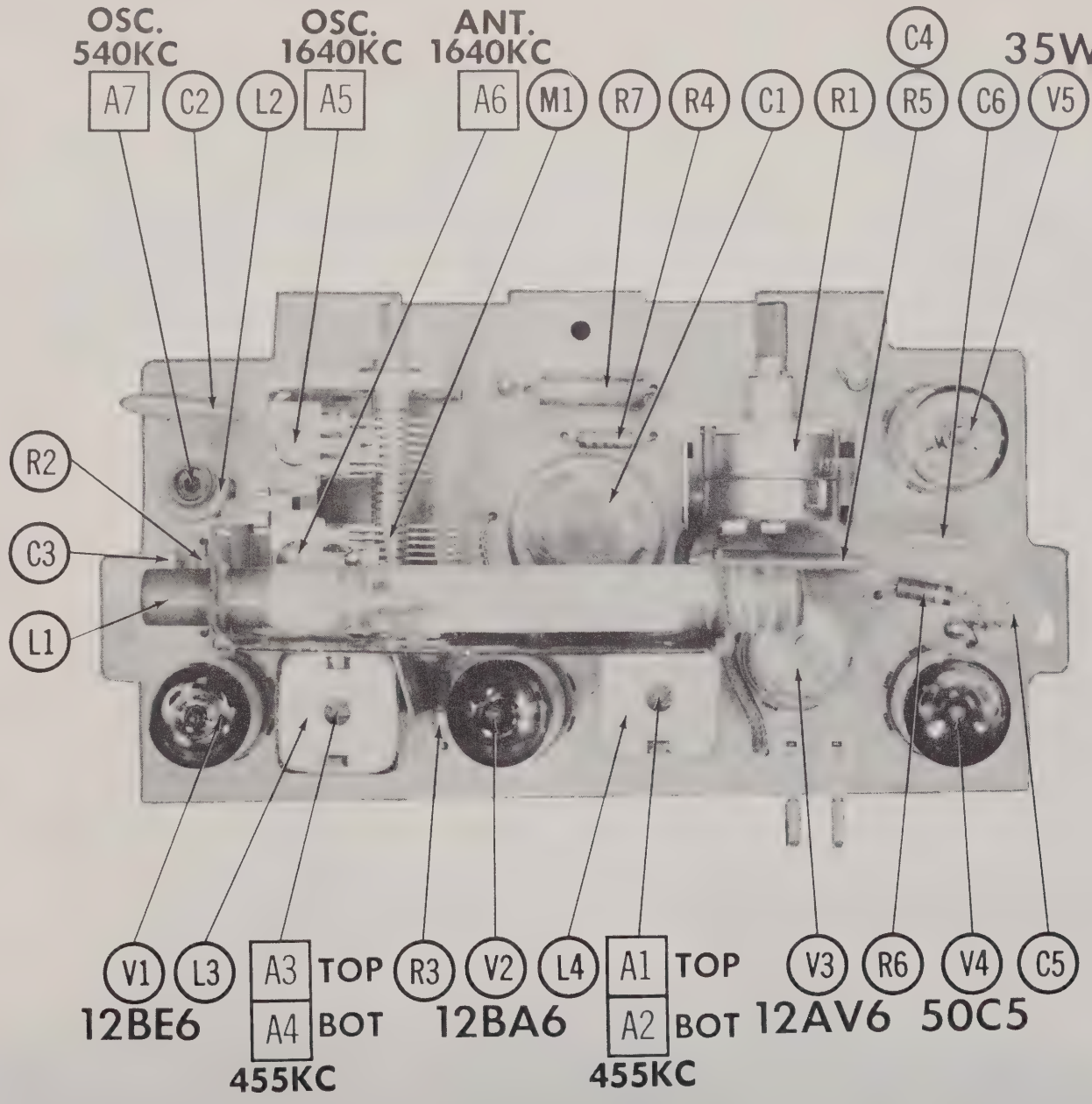


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amplifier	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	DUMONT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	03155111	PRS150V5030	BBRD5315			CADP-513	R2271 *
B	30	150							

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DUMONT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	20000		03155130	BPD-02	DD-203	K085	817-02		5HK-S2	
C3	33		03155260	N750-DI33	TCN-33	N029	N750K-330		5TCU-Q33	
C4A	220									
B	5000									
C	5000		♦88000922	♦PA-343-2					♦DT-5	
D	250									
E										
C5	4700		03153740	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C6	10000		03155560	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	

♦ Items C4A, C4B, C4C, C4D, C4E, R5A, R5B and R5C are combined in one unit. When replacing items separately, C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DUMONT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	01069561					Volume & switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DUMONT PART No.	IRC PART No.	
R2	22K		02041930	BTS-22K	
R3	120Ω		02031660	BTS-120	
R4	3.3Meg 5%		02032630	BTS-3.3Meg 5%	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DUMONT PART No.	IRC PART No.	
R5A	6.8Meg		♦88000922	BTS-6.8Meg	
B	470K			BTS-470K	
C	470K			BTS-470K	
R6	150Ω		02031670	BTS-150	
R7	1200Ω	1	02034780	BTA-1200	

♦ Items R5A, R5B, R5C, C4A, C4B, C4C, C4D, C4E are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DUMONT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2850Ω	3-4Ω	20010221	ZL103 ①	A-3031 ①	A-3336 ①	24S50A ①	S-16X ①	① Drill one new mounting hole.

SPEAKER

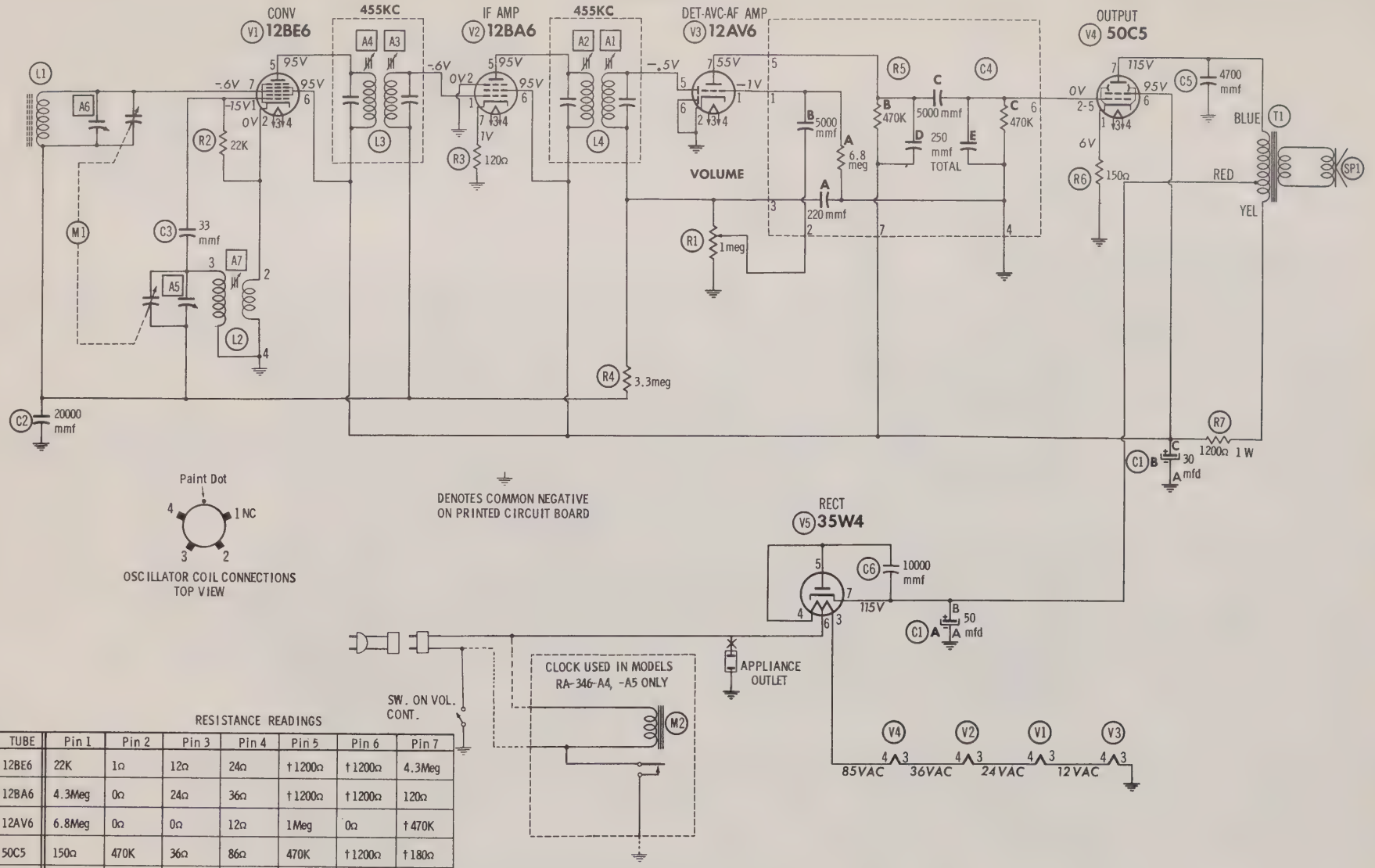
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	DUMONT PART No.	QUAM PART No.	RCA TYPE No.	
SP1	3½"	PM	3-4Ω	18003871	3A07		

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	DUMONT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	.6Ω		22002321				
L2	Osc. Coil	1Ω	11Ω	21014221				
L3	Input IF	18Ω	18Ω	20010231	16-6780		13-PC1	
L4	Output IF	18Ω	18Ω	20010231	16-6780		13-PC2	

MISCELLANEOUS

ITEM No.	PART NAME	DUMONT PART No.	NOTES
M1	Tuning Cap.	03155101	2 Gang
M2	Clock	28001811	Used in Models RA-346-A4, RA-346-A5
	Cabinet	33034995	Traditional, Model RA-346
	Cabinet	33034994	Chinese, Model RA-346
	Cabinet	33035005	Traditional, Models RA-346-A4, RA-346-A5
	Cabinet	33035004	Chinese, Models RA-346-A4, RA-346-A5
	Knob	45006632	On-off-volume & tuning (traditional) Model RA-346
	Knob	45006633	On-off-volume & tuning (Chinese) Model RA-346
	Knob	45006642	On-off-volume (traditional) Models RA-346-A4, RA-346-A5
	Knob	45006643	On-off-volume (Chinese) Models RA-346-A4, RA-346-A5
	Knob	45006652	Tuning (traditional) Models RA-346-A4, RA-346-A5
	Knob	45006653	Tuning (Chinese) Models RA-346-A4, RA-346-A5
	Knob	45006672	Clock (traditional) (3 used), Models RA-346-A4, RA-346-A5
	Knob	45006673	Clock (Chinese) (3 used), Models RA-346-A4, RA-346-A5
	Front Panel	33035051	Traditional, Model RA-346
	Front Panel	33035031	Chinese, Model RA-346
	Front Panel	33035071	Traditional, Models RA-346-A4, RA-346-A5
	Front Panel	33035041	Chinese, Models RA-346-A4, RA-346-A5
	Dial Scale	45006661	Volume, Model RA-346
	Dial Scale	45006662	Selector, Model RA-346
	Window	45006621	Clock, Models RA-346-A4, RA-346-A5
	Printed Circuit Plate	88001301	



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1Ω	12Ω	24Ω	†1200Ω	†1200Ω	4.3Meg
V2	12BA6	4.3Meg	0Ω	24Ω	36Ω	†1200Ω	†1200Ω	120Ω
V3	12AV6	6.8Meg	0Ω	0Ω	12Ω	1Meg	0Ω	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1200Ω	†180Ω
V5	35W4	NC	NC	86Ω	120Ω	117Ω	120Ω	20K

† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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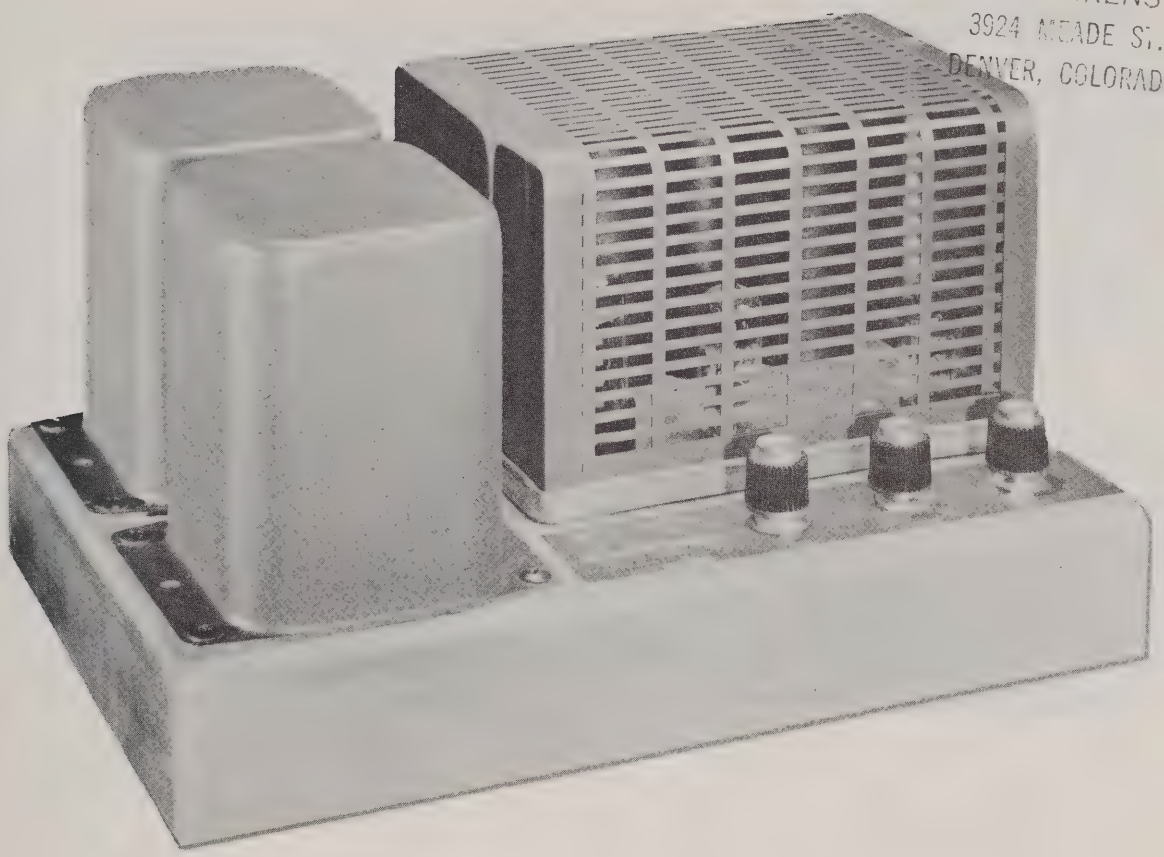
ELECTRO-VOICE
MODEL A20



ELECTRO-VOICE
MODEL A20

TRADE NAME	Electro-Voice Model A20
MANUFACTURER	Electro-Voice, Inc., Buchanan, Mich.
TYPE SET	AC Operated 20 Watt Amplifier
TUBES (Six)	Types 12AX7 AF Amplifier-Phase Inverter, 12BH7A Driver, (2) 6V6GT Output, (2) 6X4 Rectifier
POWER SUPPLY	105-125 Volts AC - 60 Cycles RATING .59 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp.-Phase Inv.	12AX7	
V2	Driver	12BH7A	
V3	Output	6V6GT	

ITEM No.	USE	TYPE	NOTES
V4	Output	6V6GT	
V5	Rectifier	6X4	
V6	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Electro-Voice PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	500	4247	AFH2-72	B053	FP288	TMD-62	D-275	R1495 *
B	▲40	500							
C2A	▲40	500	4247	AFH2-72	B053	FP288	TMD-62	D-275	R1495 *
B	▲40	500							
C3	20	450	4246	AFH1-50	A046	FP144	TMS-55	S-260	TVL-1714
C4	50	100	4242	PRS150V50	BR5015	TC49	TD-50-150	FM-1550	TVA-1414

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Electro-Voice PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	.1	200	4265	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C6	100		4281	BPD-0001	DD-101	G042 •	831-101	UC-531	5GA-T1	
C7	.022	400	4260	BPD-02	DD-203	CUB4S22	817-02	PT4122	4TM-S22	
C8	.047	400	4243	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	.047	400	4243	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C10	10000		4257	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C11	.1	600	4241	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C12	.1	600	4241	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C13	.047	400	4243	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C14	.047	400	4243	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Electro-Voice PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	250K	½	J4686	B-51	A47-250K-Z	Q13-130	U44	Level
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	1Ω	2	K4686					Damping factor- wire wound
B	1800Ω	2						Damping factor- wire wound

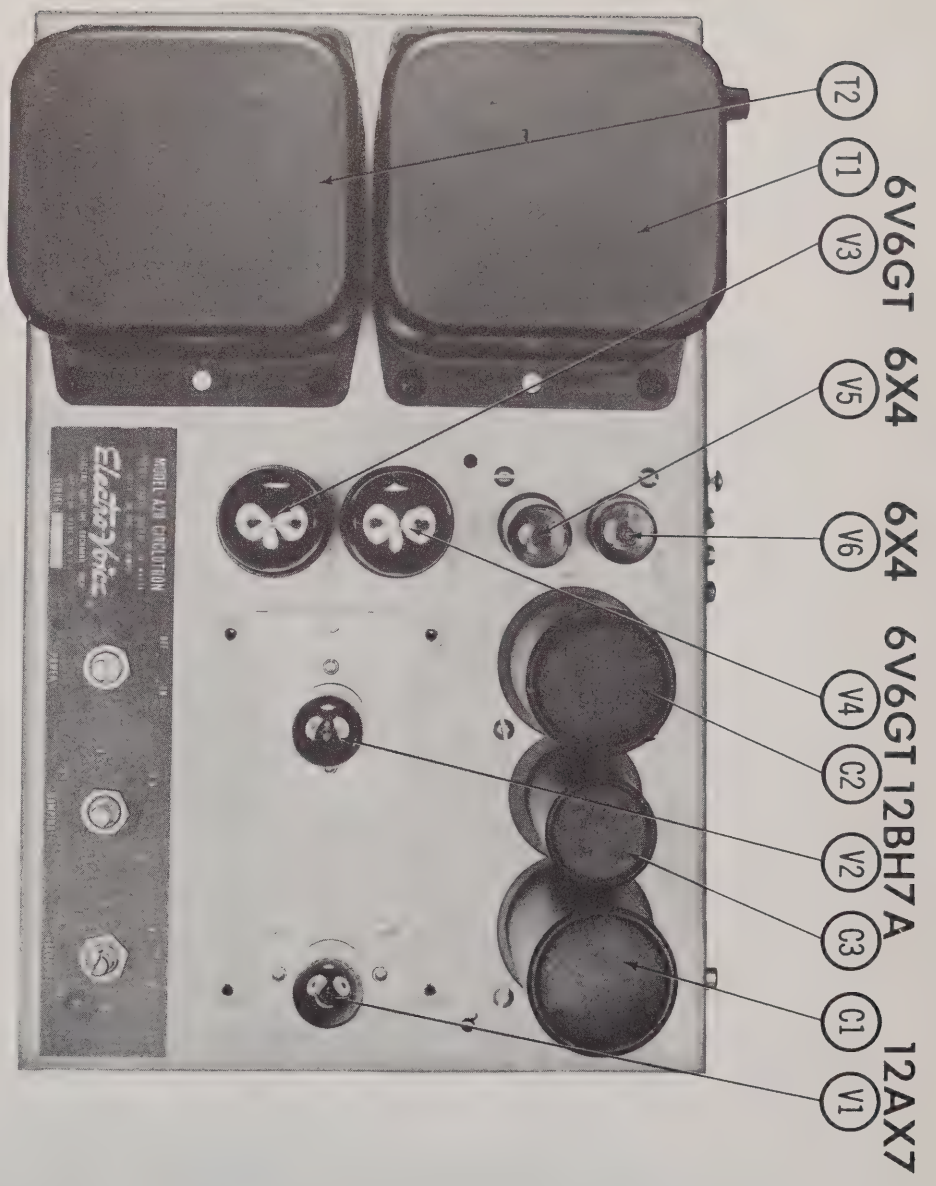
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Electro-Voice PART No.	IRC PART No.	
R3	270K		4669	BTS-270K	
R4	27K		4651	BTS-27K	
R5	1.2Meg		4656	BTS-1.2Meg	
R6	27K		4651	BTS-27K	
R7	470Ω		4654	BTS-470	
R8	27K		4651	BTS-27K	
R9	470K		4650	BTS-470K	
R10	470K		4650	BTS-470K	
R11	12K	2	4679	BTB-12K	
R12	12K	2	4679	BTB-12K	
R13	1200Ω		4658	BTS-1200	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Electro-Voice PART No.	IRC PART No.	
R14	120Ω		4607	BTS-120	
R15	470K		4650	BTS-470K	
R16	470K		4650	BTS-470K	
R17	120Ω		4607	BTS-120	
R18	47K		4668	BTS-47K	
R19	1000Ω		4693	BTS-1000	
R20	56K		4652	BTS-56K	
R21	56K		4652	BTS-56K	
R22	100Ω	2	4655	BTB-100	
R23	100Ω	2	4655	BTB-100	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .59A	710VCT @ .029A	715VCT @ .025A	6.3VAC @ 3.05A SEC. 4 20VAC *	1580					

* Bias supply.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	2000Ω	16Ω tap @ 8Ω, 4Ω	1579						

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA						
			Electro-Voice PART No.		LITTELFUSE PART No.		BUSS PART No.		
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER	
M1	3AG S/B	1½A 125V			31301.5 (3AG S/B 1½A)	342001	MDL 1½	HKP	

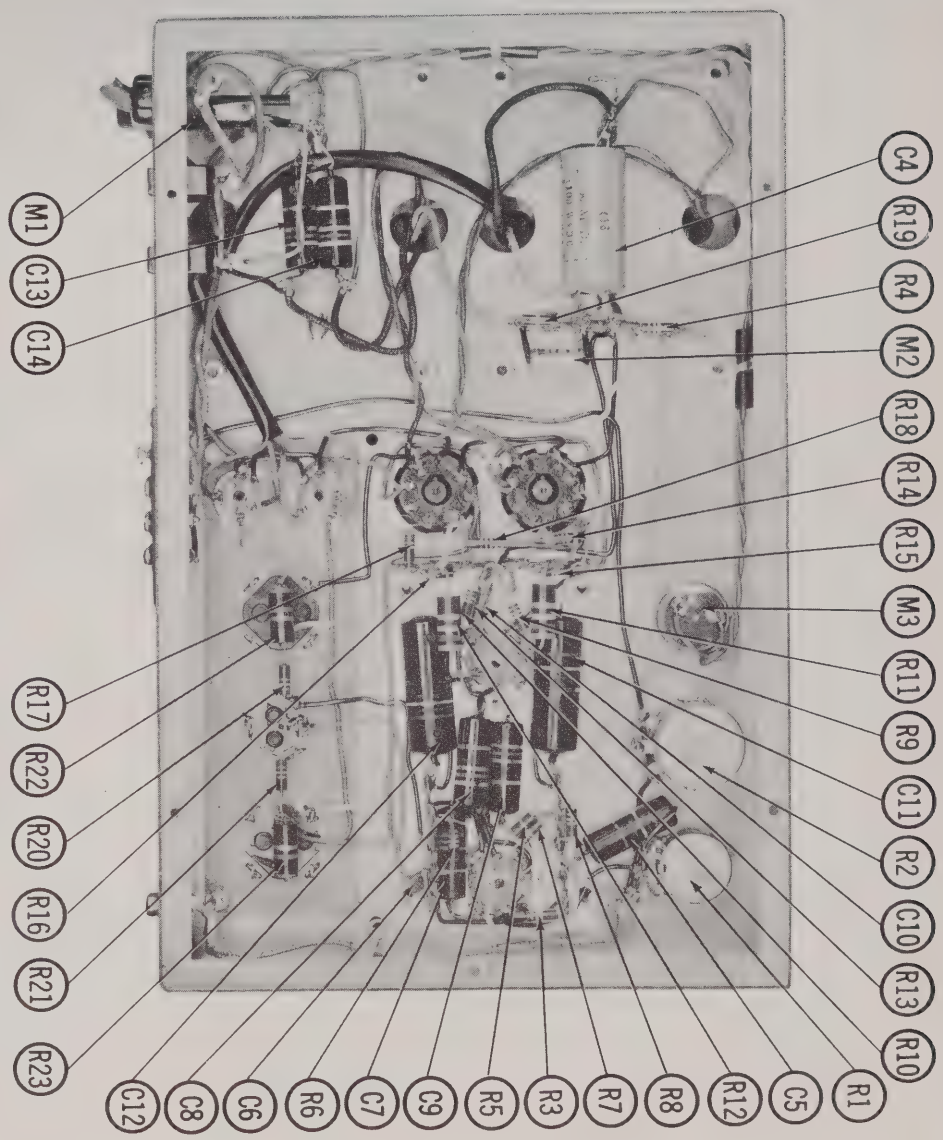
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Electro-Voice PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M2		5914	1159	CR10	8S20		10	

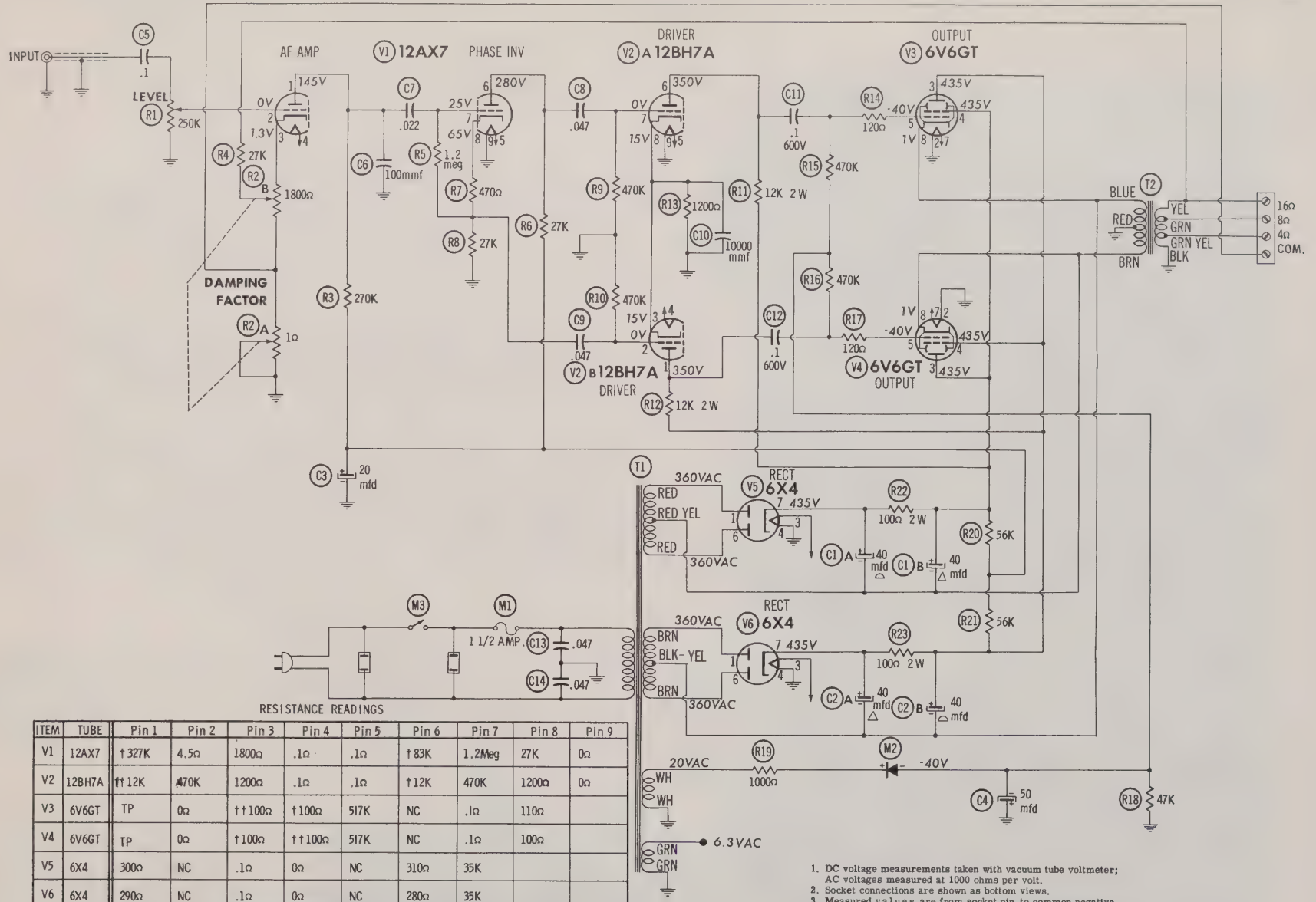
MISCELLANEOUS

ITEM No.	PART NAME	Electro-Voice PART No.	NOTES
M3	Switch	B5641	On-off (power) SPST

CHASSIS—BOTTOM VIEW



ELECTRO-VOICE MODEL A20



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†327K	4.5Ω	1800Ω	.1Ω	.1Ω	†83K	1.2Meg	27K	0Ω
V2	12BH7A	††12K	470K	1200Ω	.1Ω	.1Ω	†12K	470K	1200Ω	0Ω
V3	6V6GT	TP	0Ω	††100Ω	†100Ω	517K	NC	.1Ω	110Ω	
V4	6V6GT	TP	0Ω	†100Ω	††100Ω	517K	NC	.1Ω	100Ω	
V5	6X4	300Ω	NC	.1Ω	0Ω	NC	310Ω	35K		
V6	6X4	290Ω	NC	.1Ω	0Ω	NC	280Ω	35K		

† MEASURED FROM PIN 7 OF V5. TP TIE POINT.
†† MEASURED FROM PIN 7 OF V6.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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EMERSON
MODEL 832B (Ch. 120266B)

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

EMERSON
MODEL 832B (Ch. 120266B)

EMERSON
MODEL 832B (Ch. 120266B)

TRADE NAME	Emerson Model 832B, (Ch. 120266B)
MANUFACTURER	Emerson Radio & Phono Corp., 14th & Coles Sts., Jersey City 2, N. J.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 (or) 12AT6 Det-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC — RATING .21 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.005MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A6	"

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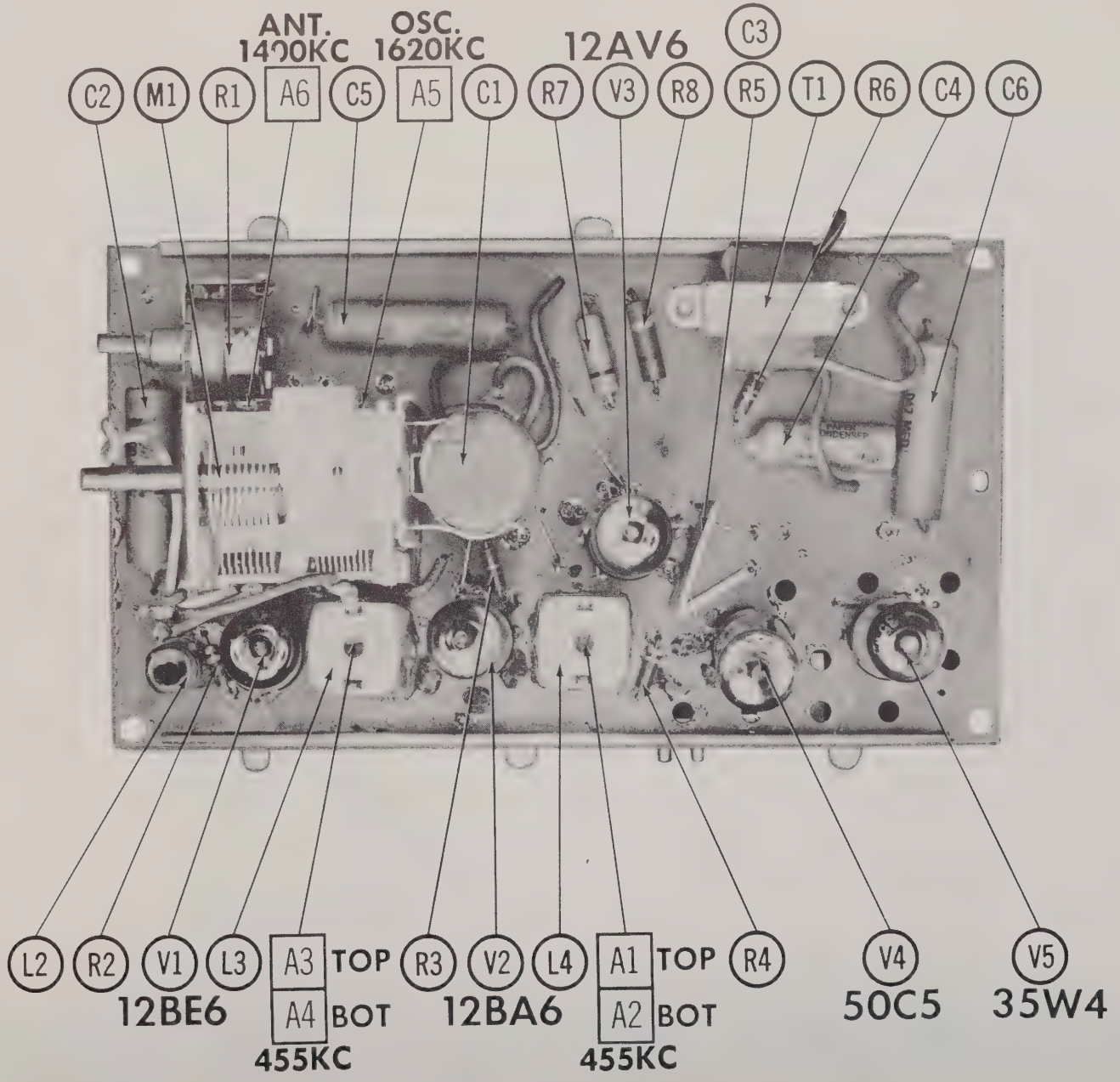


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det-AVC-AF Amp.	12AV6	Note 1
V4	Output	50C5	
V5	Rectifier	35W4	

Note 1: 12AT6 may be used in some versions.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	150	925328	PRS150V3030	BBRT32V215	TCT3113	TDLT-2	FMT-1530	TVA-3444
B	30	150		20					
C	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.047	400	923554	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C3A	220									
B	2000									
C	5000		†923028	†PA-113-3	†PC-154				†DT-3	
D, E	500									
C4	.022	400	923524	BPD-02	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C5	.047	400	923554	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C6	.047	400	923554	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

† Items C3A, C3B, C3C, C3D, C3E, R5A, R5B and R5C are combined in one unit. When replacing items separately, C3D and C3E should total 500MMF.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA EMERSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K	½	390278					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA EMERSON PART No.	IRC PART No.	NOTES
R2	22K		340812	BTS-22K	
R3	120Ω		340272	BTS-120	
R4	3.3Meg		351332	BTS-3.3Meg	
R5A	6.8Meg			BTS-6.8Meg	
B	470K		†923028	BTS-470K	
C	470K			BTS-470K	
R6	150Ω		340292	BTS-150	
R7	1000Ω	1	370492	BTA-1000	
R8	100Ω	1	370252	BTA-100	

† Items R5A, R5B, R5C, C3A, C3B, C3C, C3D and C3E are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA EMERSON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2000Ω	3-4Ω	734111				26S58		

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA EMERSON PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	6"	PM	3-4Ω	180095	6A1	229S1	

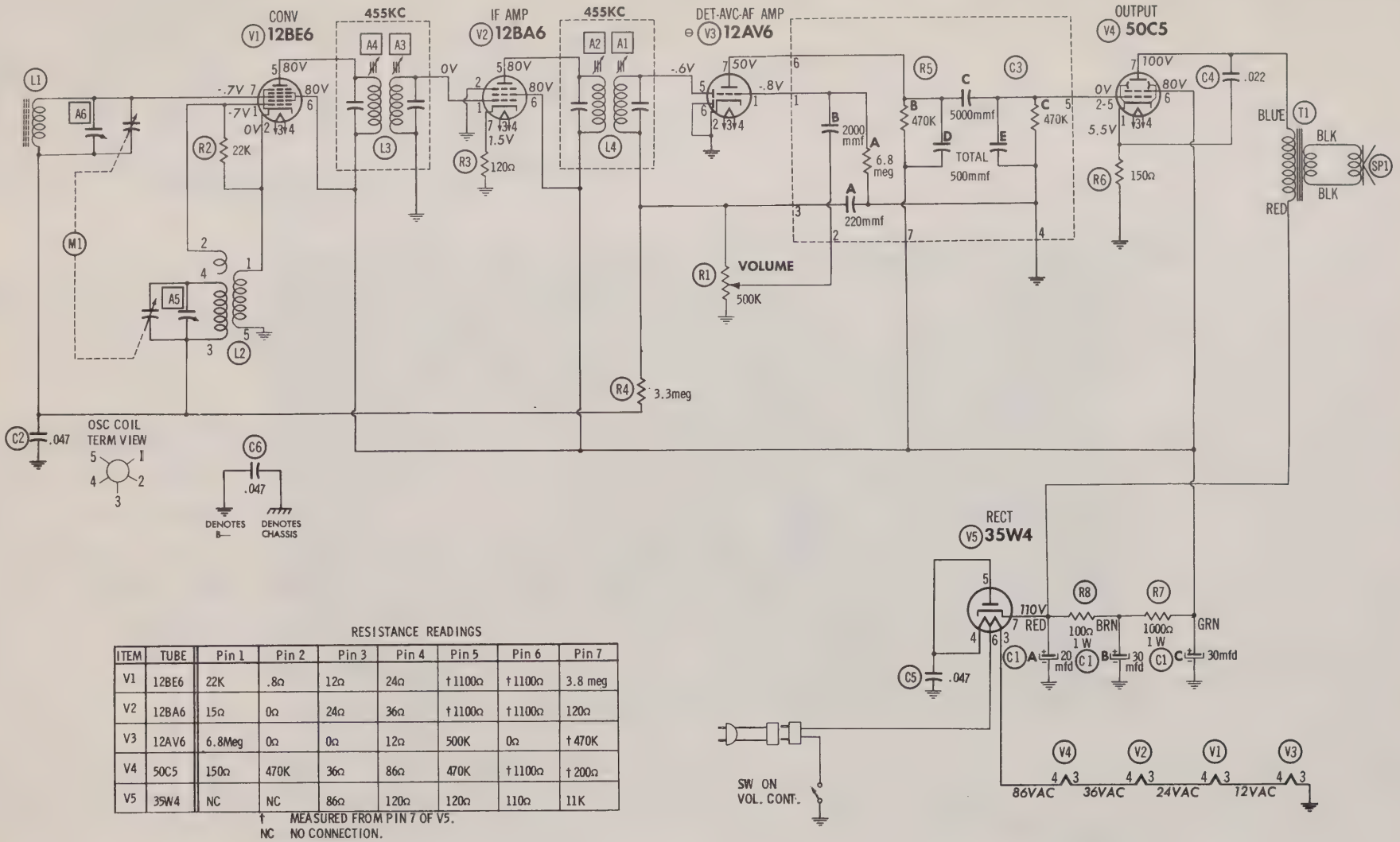
COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA EMERSON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Stick	.5Ω		700102				
L2	Osc. Coil	.8Ω	12Ω	716091				
L3	Input IF	15Ω	15Ω	720203	16-6780		13-PC1	
L4	Output IF	15Ω	15Ω	720203	16-6780		13-PC2	

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M1	Tuning Cap.	900123	2 Gang (15-260MMF, 18-120MMF)
	Cabinet	140679	French Grey
	Cabinet	140679A	Ivory
	Cabinet	140679B	Ebony
	Cabinet	140679C	Forest Green
	Cabinet	140679G	Mahogany
	Knob	460613	Tuning, French Grey
	Knob	460613A	Tuning, Ivory
	Knob	460613B	Tuning, Ebony
	Knob	460613C	Tuning, Forest Green
	Knob	460613G	Tuning, Mahogany
	Knob	460614	On-Off-Volume, French Grey
	Knob	460614A	On-Off-Volume, Ivory
	Knob	460614B	On-Off-Volume, Ebony
	Knob	460614C	On-Off-Volume, Forest Green
	Knob	460614G	On-Off-Volume, Mahogany

EMERSON MODEL 832B (Ch. 120266B)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.8Ω	12Ω	24Ω	†1100Ω	†1100Ω	3.8 meg
V2	12BA6	15Ω	0Ω	24Ω	36Ω	†1100Ω	†1100Ω	120Ω
V3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500K	0Ω	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1100Ω	†200Ω
V5	35W4	NC	NC	86Ω	120Ω	120Ω	110Ω	11K

† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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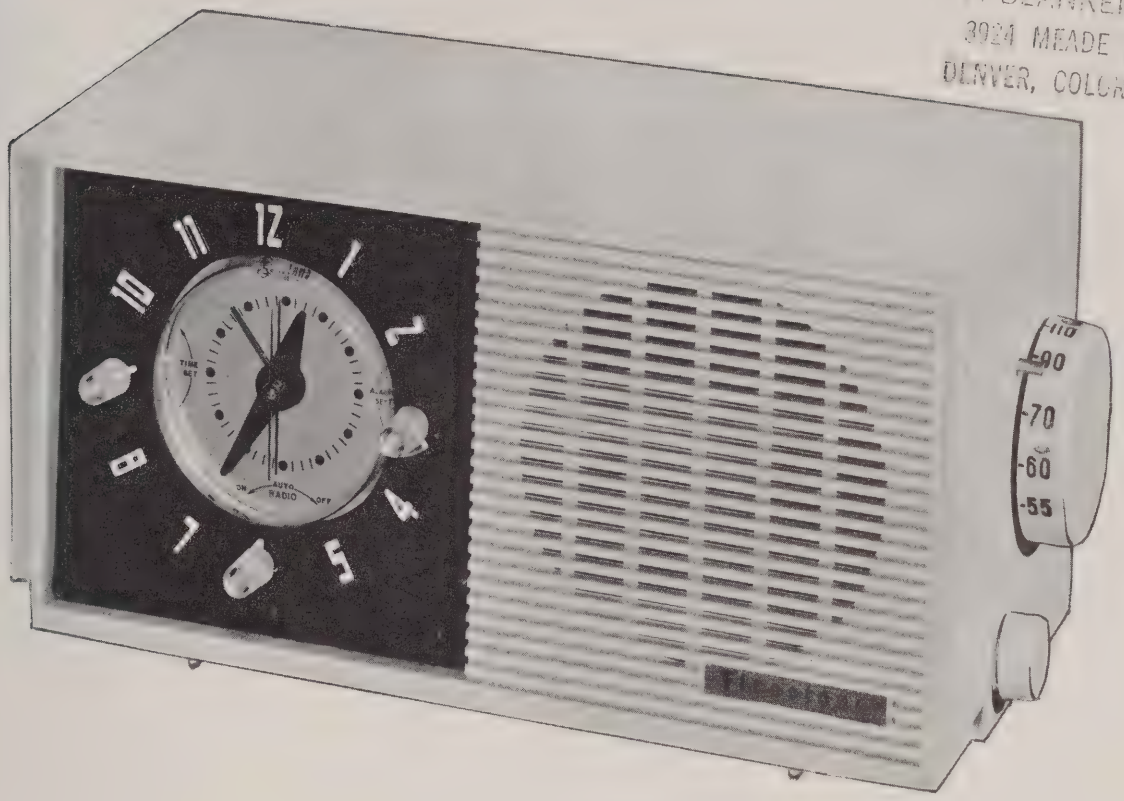
FIRESTONE MODEL
4-A-134 (Code 1-5-4C2)



FIRESTONE MODEL
4-A-134 (Code 1-5-4C2)

TRADE NAME	Firestone Model 4-A-134 (Code 1-5-4C2)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ mod.)	Tuning gang fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

FIRESTONE MODEL 4-A-134

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amplifier	12AT6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	150		PRS150V8040	BBRT84215	TCT3117	TDLT-7	FMT-339	TVA-3455
B	80	150		20					
C	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	10									
C4A	100		†	†PA-97-1	†PC-50	†111TM1	†1403-01	UC-531	†D-1	
B	100							UC-531		
C5A	220									
B	5000									
C	5000		♦	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C6	.01	600		BPD-01	DD-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C7	.01	600		BPD-01	DD-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C8	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

† Items C4A, C4B and R5 are combined in one unit.
♦ Items C5A, C5B, C5C, C5D, C5E, R7A , R7B and R7C are combined in one unit.
When replacing items separately C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	VC-64	AB-70	A47-1Meg-Z	Q13-137	U53	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

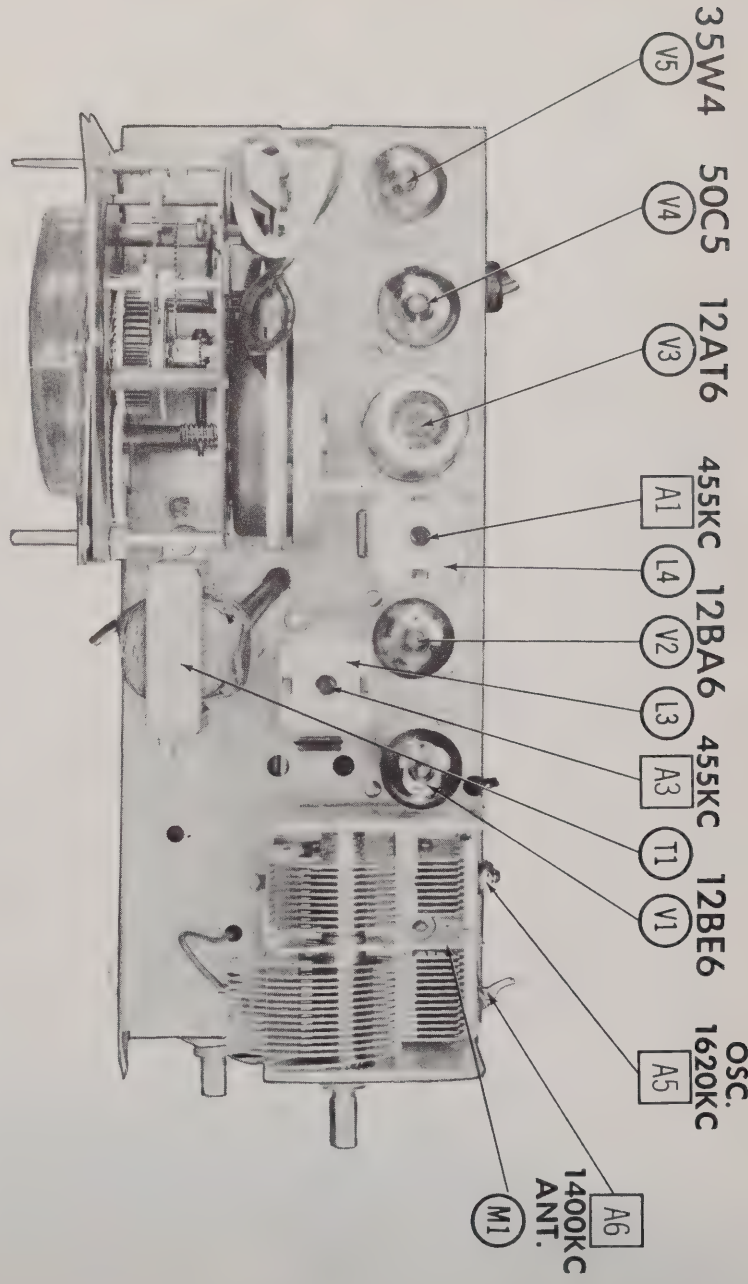
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	22K			BTS-22K	
R3	220K			BTS-220K	
R4	150Ω			BTS-150	
R5	47K		†	BTS-47K	
R6	2.2Meg			BTS-2.2Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R7A	6.8Meg		♦	BTS-6.8Meg	
B	470K			BTS-470K	
C	470K			BTS-470K	
R8	150Ω	1		BTA-150	
R9	2200Ω	1		BTA-2200	
R10	330Ω	1		BTA-330	

† Items R5, C4A, C4B are combined in one unit.
♦ Items R7A, R7B, R7C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2850Ω	3-4Ω	TR-120	Z1101	A-3025	A-3332	26S58	S-16X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	SP-102-1	4A07	223S1	

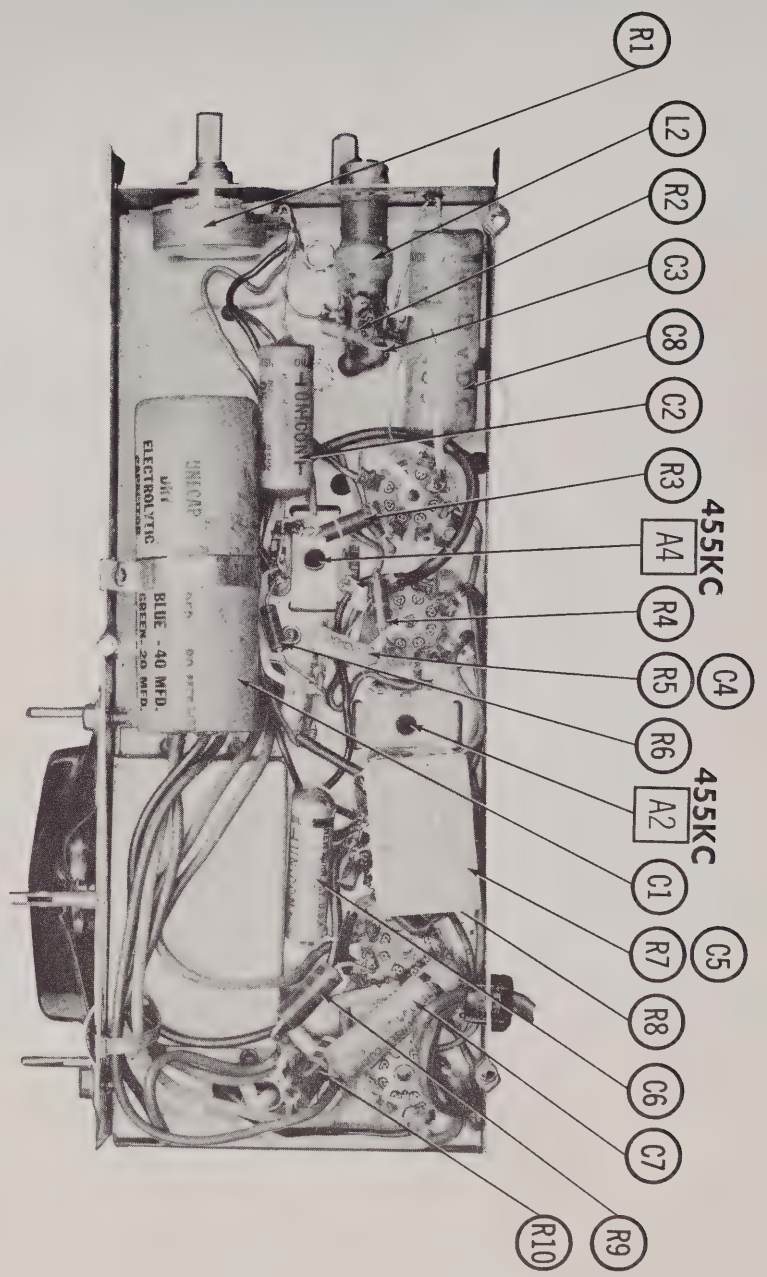
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.7Ω					69-OSC *	* Drill new mounting hole
L2	Osc. Coil	.5Ω	5.5Ω					
L3	Input IF	23Ω	23Ω	LF-50	16-6758	BC-352	12-C1	
L4	Output IF	23Ω	23Ω	LF-50	16-6758	BC-353	12-C2	

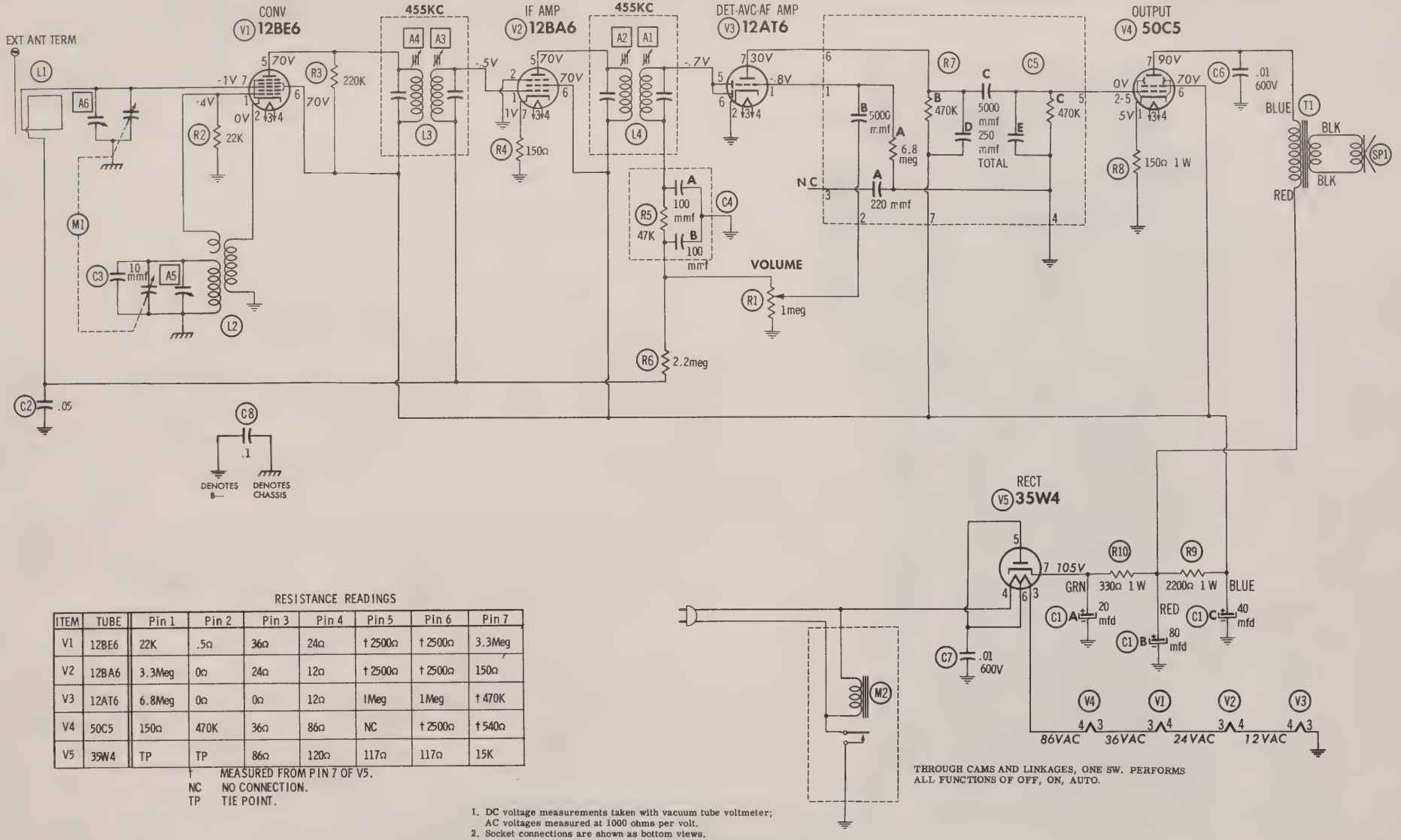
MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M1	Tuning Cap.	CV-67	2 Gang (31-470MMF, 17-185MMF)
M2	Clock		

CHASSIS—BOTTOM VIEW



FIRESTONE MODEL 4-A-134



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.5Ω	36Ω	24Ω	†2500Ω	†2500Ω	3.3Meg
V2	12BA6	3.3Meg	0Ω	24Ω	12Ω	†2500Ω	†2500Ω	150Ω
V3	12AT6	6.8Meg	0Ω	0Ω	12Ω	1Meg	1Meg	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	NC	†2500Ω	†540Ω
V5	35W4	TP	TP	86Ω	120Ω	117Ω	117Ω	15K

† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO.

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MAGNAVOX
CHASSIS AMP-148

PROPERTY OF
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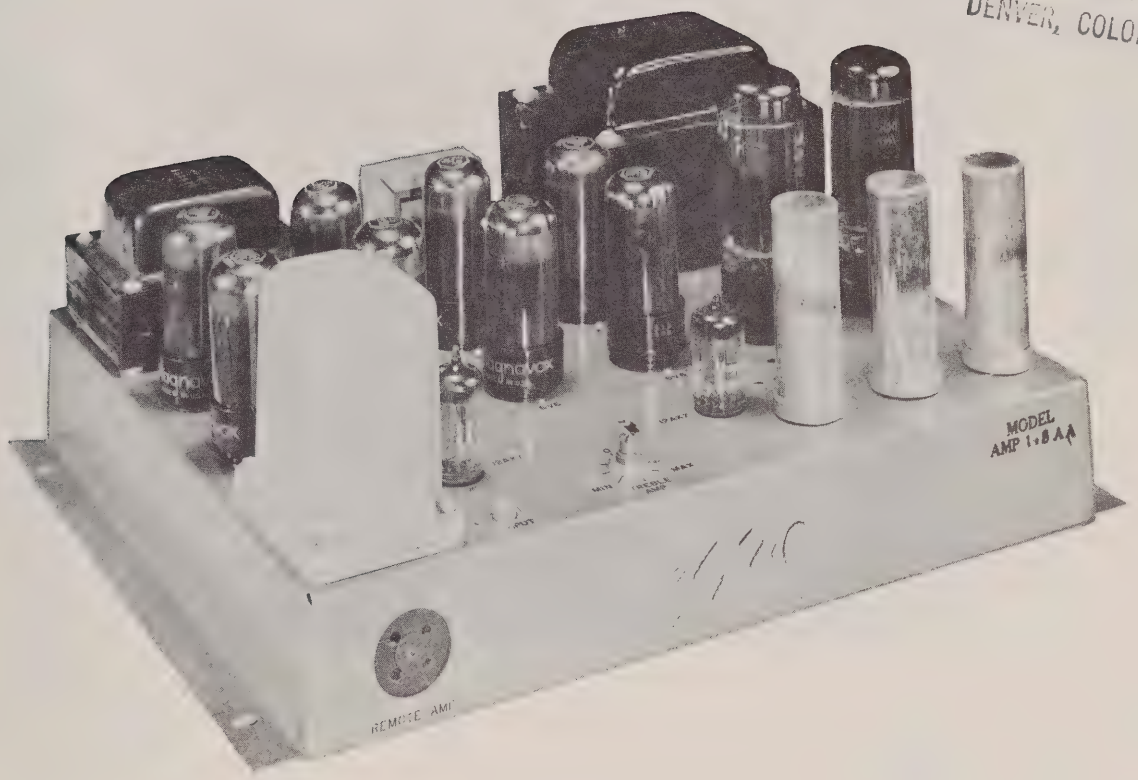
MAGNAVOX
CHASSIS AMP-148



MAGNAVOX
CHASSIS AMP-148

TRADE NAME	Magnavox Chassis AMP-148	
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Indiana	
TYPE SET	AC Operated Amplifier	
TUBES	Twelve	
POWER SUPPLY	110-120 Volts AC - 50/60 Cycles	RATING 1.88 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

MAGNAVOX CHASSIS AMP-148

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. -Phase Inv.	12AX7	
V2	Low Freq. Output	6V6GT	
V3	Low Freq. Output	6V6GT	
V4	Low Freq. Output	6V6GT	
V5	Low Freq. Output	6V6GT	
V6	Low Freq. Output	6V6GT	

ITEM No.	USE	TYPE	NOTES
V7	Low Freq. Output	6V6GT	
V8	AF Amp. -Phase Inv.	12AX7	
V9	Hi Freq. Output	6V6GT	
V10	Hi Freq. Output	6V6GT	
V11	Rectifier	5U4GA	
V12	Rectifier	5U4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■30	475	270023-2	AFH2-52	B0410	FP259	TMD-51	T-135	TVL-3778
B	▲10	475							
C2A	■30	475	270023-2	AFH2-52	B0410	FP259	TMD-51	T-135	TVL-3778
B	▲10	475							
C3A	■30	475	270023-2	AFH2-52	B0410	FP259	TMD-51	T-135	TVL-3778
B	▲10	475							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

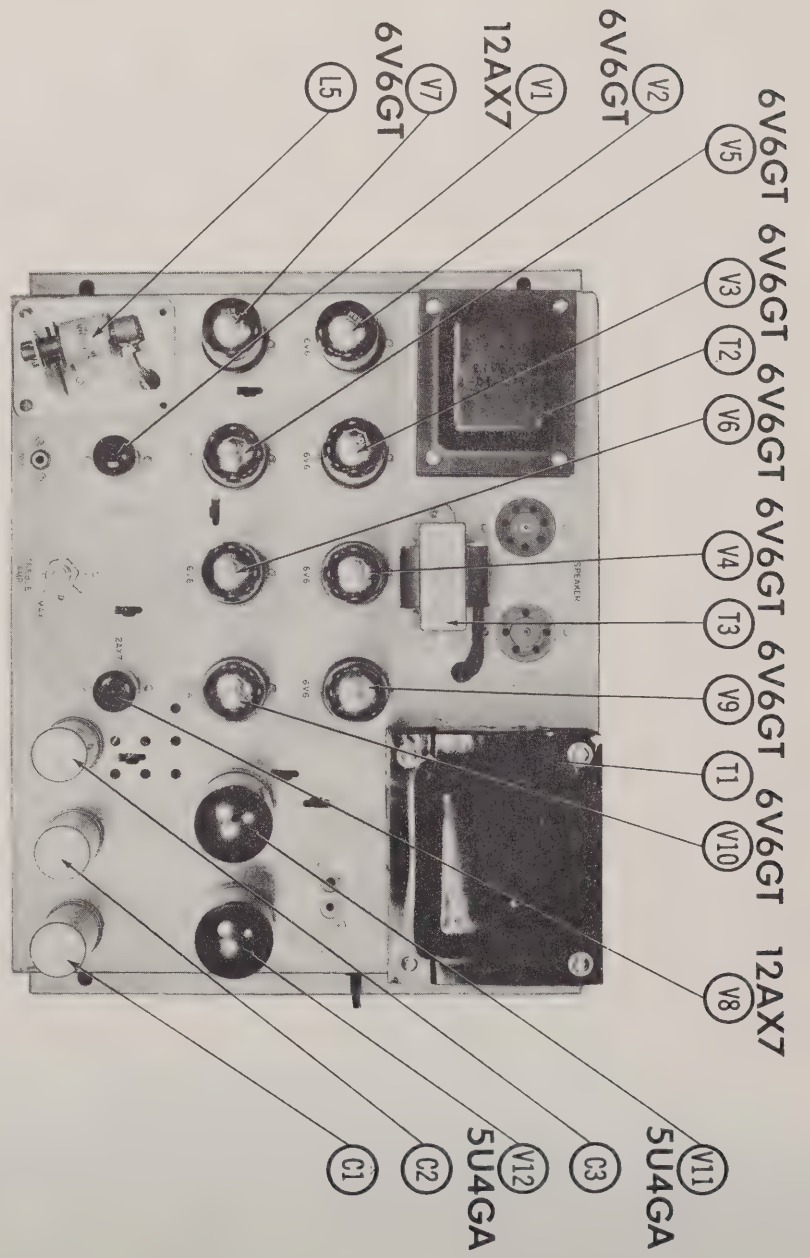
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	.015	200	250202-8	BPD-015	DD16-153	CUB6S15	821-015	PT4115	4TM-S15	
C5	.047	200		BPD-05	DF-503	CUB4S5		PT4147	2TM-S47	
C6	220		250218-5	DI-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C7	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C8	.1	600	250201-13	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C9	.1	600	250201-13	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C10	2000		250218-20	BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C11	.015	200	250202-8	BPD-015	DD16-153	CUB6S15	821-015	PT4115	4TM-S15	
C12	.068	200	250202-12	P288N-068		CUB4S68			4TM-S68	
C13	5000		250175-30	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C14	220		250218-5	DI-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C15	220		250218-5	DI-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C16	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C17	10000		250218-19	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C18A	10000	1500		P1688N-01	DD16-103	CUB16S1		PT1611	16TM-S1	Note 1
B	10000	1500		P1688N-01	DD16-103	CUB16S1		PT1611	16TM-S1	Note 1

Note 1: Some versions may use individual units (part #250219-3) in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5000Ω	½	220126-49	AB-10	A47-5000-S	Q11-114	U14	Treble
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R1A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R2	15K		230104-76	BTS-15K	
R3	220K		230104-90	BTS-220K	
R4	220K		230104-90	BTS-220K	
R5	1500Ω		230104-64	BTS-1500	
R6	20K 5%		230094-190	BTS-20K 5%	
R7	220K		230104-90	BTS-220K	
R8	5600Ω		230104-71	BTS-5600	
R9	220K		230104-90	BTS-220K	
R10	100Ω		230104-50	BTS-100	
R11	100Ω		230104-50	BTS-100	
R12	100Ω		230104-50	BTS-100	
R13	100Ω		230104-50	BTS-100	
R14	220K		230104-90	BTS-220K	
R15	75Ω	10	240021-16	PW10-75	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R16	15K	1	230104-76	BTA-15K	
R17	22K		230104-78	BTS-22K	
R18	15K		230104-76	BTS-15K	
R19	1000Ω		230104-62	BTS-1000	
R20	150K		230104-88	BTS-150K	
R21	22K		230104-78	BTS-22K	
R22	150K		230104-88	BTS-150K	
R23	5600Ω		230104-71	BTS-5600	
R24	18K	1	230107-77	BTA-18K	
R25	220K		230104-90	BTS-220K	
R26	220K		230104-90	BTS-220K	
R27	220Ω	2	230106-54	BTB-220	
R28	100Ω		230104-50	BTS-100	
R29	100Ω		230104-50	BTS-100	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @1.88A	570VCT @.350A	5VAC @ 6A	6.3VAC @4.4A	300085-1	P9739①②	P-3055③	P-8167①②		

① Tape 6.3V, 8.5A winding.
② Drill new mounting holes.
③ Tape 6.3V, 10A winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	3300Ω	8Ω	330040-1 ①						① Low frequency output.
T3	6100Ω	8Ω	330041-1 ②	Z1004	A-2901	A-3852	26S46	S-55Z	② High frequency output.

COILS (RF-IF)

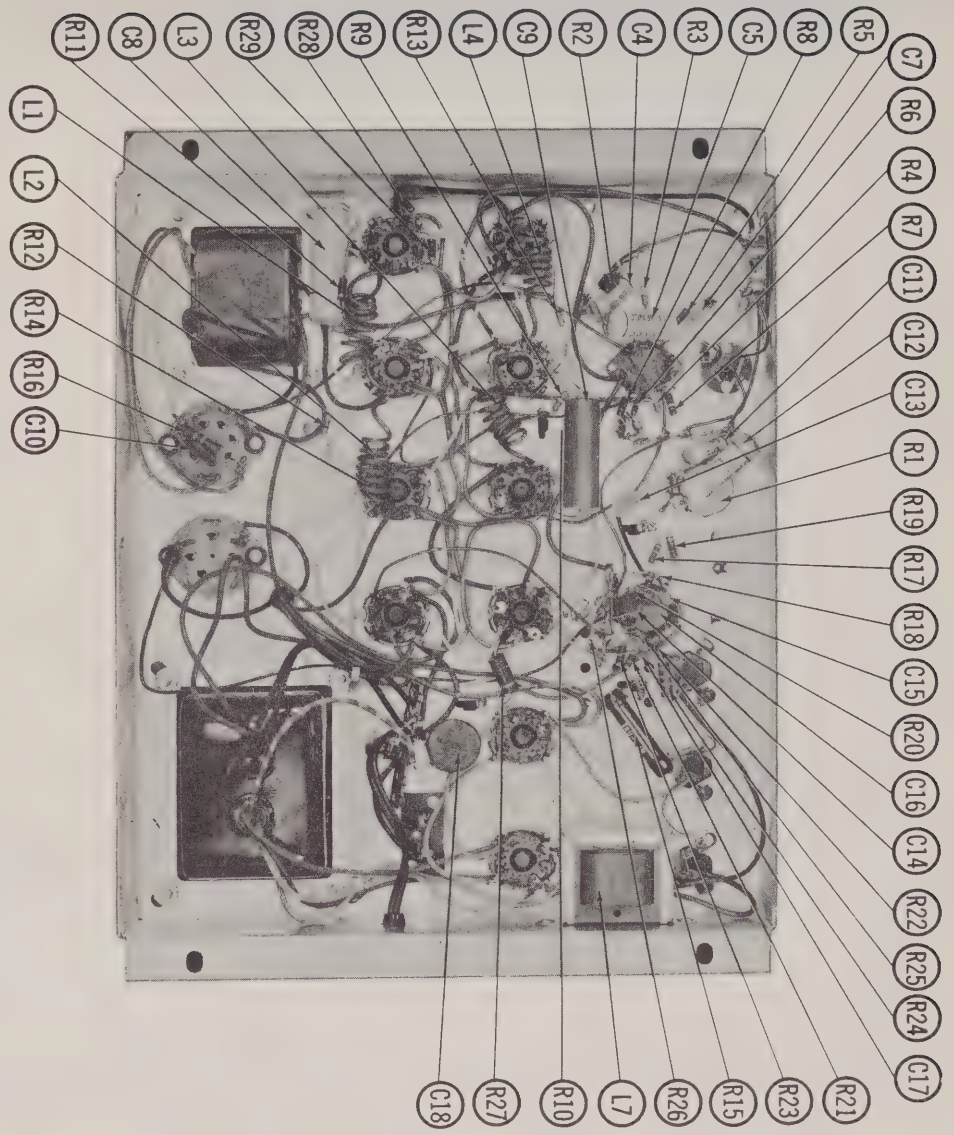
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	RF Choke	0Ω		360575-1				1.2 Microhenries
L2	RF Choke	0Ω		360575-1				1.2 Microhenries
L3	RF Choke	0Ω		360575-1				1.2 Microhenries
L4	RF Choke	0Ω		360575-1				1.2 Microhenries
L5	Crossover Choke	400Ω		360639-1				540 Microhenries
L6	Crossover Choke	400Ω		360639-1				540 Microhenries

FILTER CHOKE

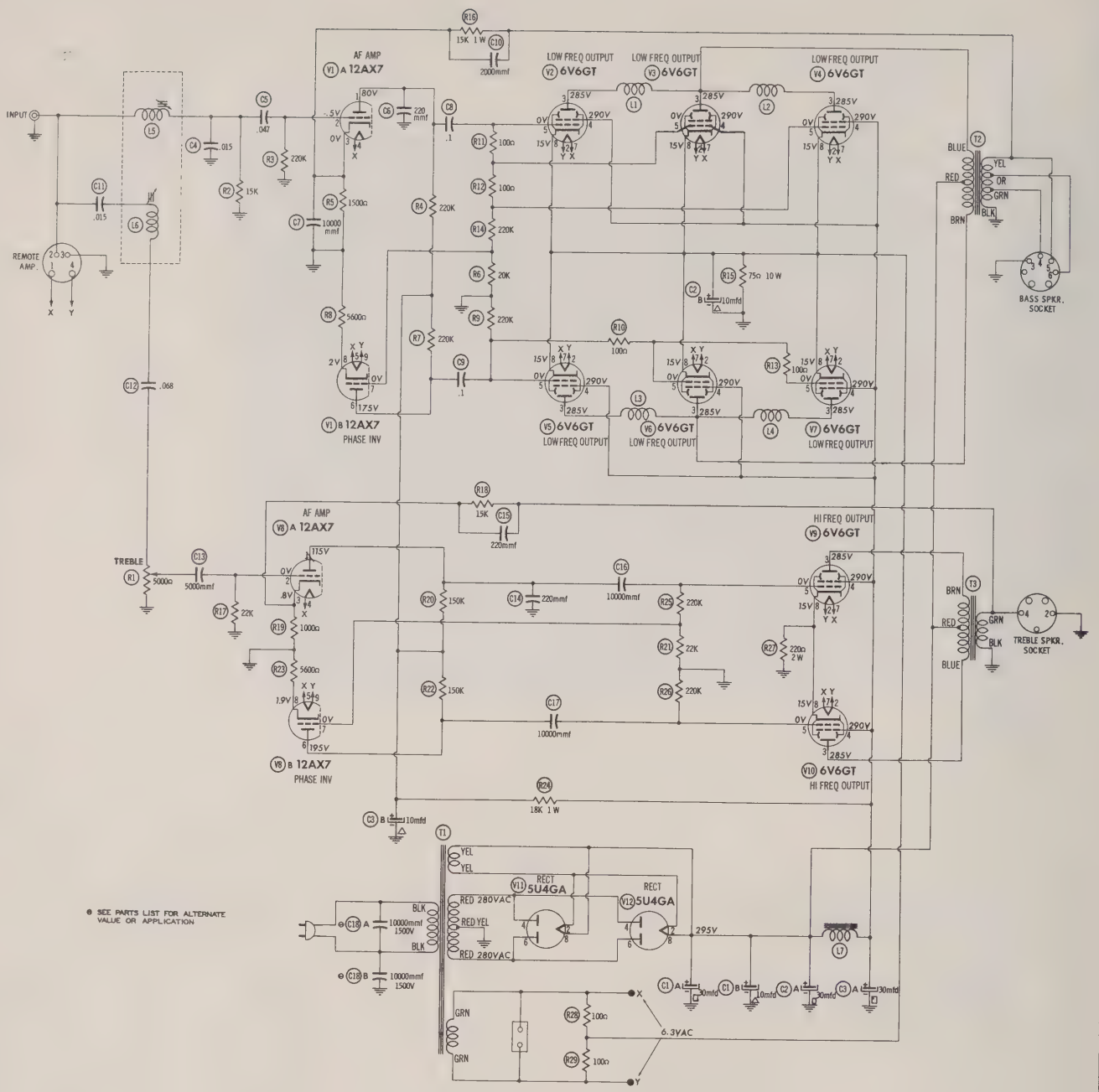
ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L7	.165A	51Ω	1HY	320041-2	C5040	C-2996 ①	C-2327	26C41	C-21X ①

① Drill one new mounting hole.

CHASSIS—BOTTOM VIEW



MAGNAVOX CHASSIS AMP-148



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	↑240K	220K	1500Ω	125Ω	125Ω	↑240K	20K	5600Ω	125Ω
V2	6V6GT	NC	125Ω	↑52Ω	↑55Ω	240K	NC	125Ω	75Ω	
V3	6V6GT	NC	125Ω	↑52Ω	↑55Ω	240K	NC	125Ω	75Ω	
V4	6V6GT	NC	125Ω	↑52Ω	↑55Ω	240K	TP	125Ω	75Ω	
V5	6V6GT	NC	125Ω	↑52Ω	↑55Ω	220K	NC	125Ω	75Ω	
V6	6V6GT	NC	125Ω	↑52Ω	↑55Ω	220K	TP	125Ω	75Ω	
V7	6V6GT	NC	125Ω	↑52Ω	↑55Ω	220K	TP	125Ω	75Ω	
V8	12AX7	↑170K	22K	1000Ω	125Ω	125Ω	↑170K	22K	5600Ω	125Ω
V9	6V6GT	NC	125Ω	↑145Ω	↑55Ω	242K	NC	125Ω	220Ω	
V10	6V6GT	NC	125Ω	↑125Ω	↑55Ω	220K	NC	125Ω	220Ω	
V11	5U4GA	NC	20K	NC	17Ω	NC	16Ω	NC	20K	
V12	5U4GA	NC	20K	NC	17Ω	NC	16Ω	NC	20K	

↑ MEASURED FROM PIN 8 OF V12.
NC NO CONNECTION
TP TIE POINT

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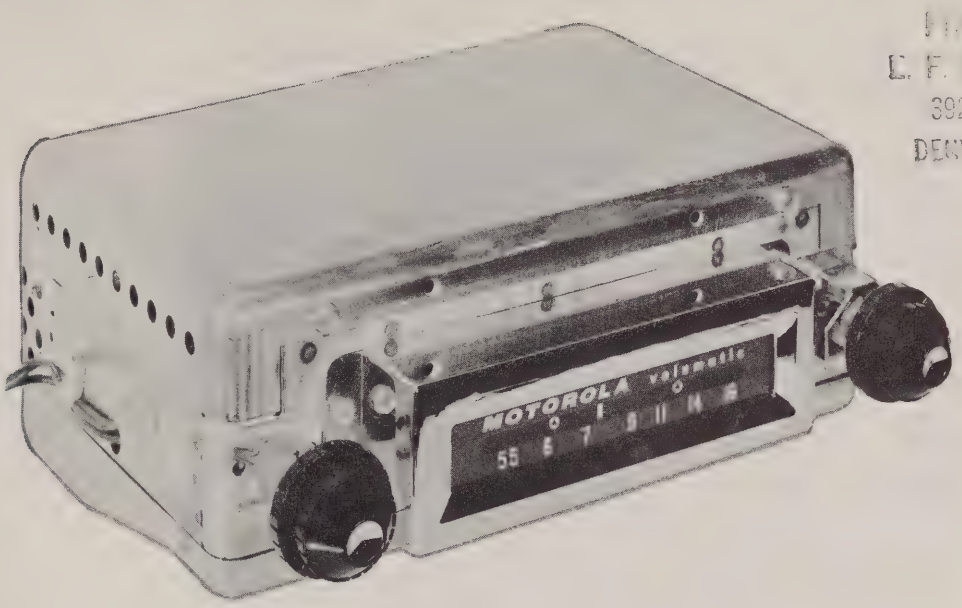

TRADE NAME	Motorola Model CTM6 (For 1955 and 1956 Chevrolet Automobiles)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Battery Operated Custom Built AM Superheterodyne Automobile Receiver
TUBES (Six)	Types 12BD6 RF Amplifier, 12BE6 Converter, 12BD6 IF Amplifier, 12CR6 Det.-AVC-AF Amplifier, 12AB5 Output, 12X4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 2.8 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Set pointer 11/32" from extreme low end of dial, if necessary.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	455KC (400\Mod)	High freq. end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1	Thru dummy to antenna receptacle	1610KC	"	"	A5, A6, A7	"
*3.	"	"	"	"	"	"	Back A8, A9, A10 (tuning cores) out of coils, but not out of coil forms. Adjust A5, A6, A7 for maximum output.
*4.	"	"	1400KC	Adjust 13/64" from high freq. end stop.	"	A8, A9, A10	Adjust for maximum output.
*5.	"	"	1610KC	High freq. end stop.	"	A5, A6, A7	Retouch for maximum output. Repeat steps 4 and 5. Cement cores.
6.	With radio installed in car and antenna fully extended, tune in a weak station near 1400KC, adjust A7 for maximum volume.						

* Not necessary, except in case of tampering or replacement of tuning coils or components.

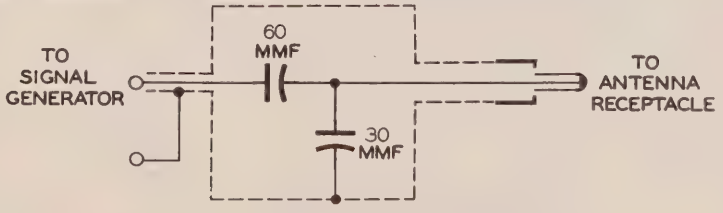

FIG. 1

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PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL CTM6

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BD6	
V2	Converter	12BE6	
V3	IF Amplifier	12BD6	

ITEM No.	USE	TYPE	NOTES
V4	Det.-AVC-AF Amplifier	12CR6	
V5	Output	12AB5	
V6	Rectifier	12X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■15	350	23A485677	AFH3-102	C077	FP328	TMT-89	T-455	R2274 *
B	▲10	350							
C	20	25							

* Non-catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	90		21A591682							
C3	150		21R410112	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C4	.05	200	8R121005	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C5	4.7		21R115955	NP0-SI4.7	TCZ-4R7	Z010	NP0A-4R7	ZT-5547	5TCCB-V47	
C6	47		21R115593	N750-DI47	TCN-47	N033	N750K-470	NT-5447	5TCU-Q47	
C7	.05	400	8R121567	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C8	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C9	.1	400	8R121006	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C10	.002	600	8R121568	BPD-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C11	.02	400	8R121770	BPD-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	
C12	.01	400	8R121002	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C13	470		21R410121	BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C14	.004	600	8R121000	BPD-004	D6-402	CUB6D4	GP2-333-402	PT624 *	6TM-D4	
C15	.04	1000	8A121549	P1088N-04		CUB16S4		PT1614	10TM-S4	
C16	.5	100	8K122076	VHC36		ST2P5		RF480	68P20	
C17	.5	100	8K122076	VHC36		ST2P5		RF480	68P20	
C18	.5	100	8K122076	VHC36		ST2P5		RF480	68P20	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	18K534294		RTV-535C	*QJ-854A		Tone (Panel)
B	250K	½						Volume, tapped ③ 125K (rear)
C	Switch							

* Concentrikit Equivalent: K-6 Kit, Base Elements & Shafts: B11-137 & P13-118 (Panel)
B13-130X & R1-130 (Rear)
76-1 (Switch)

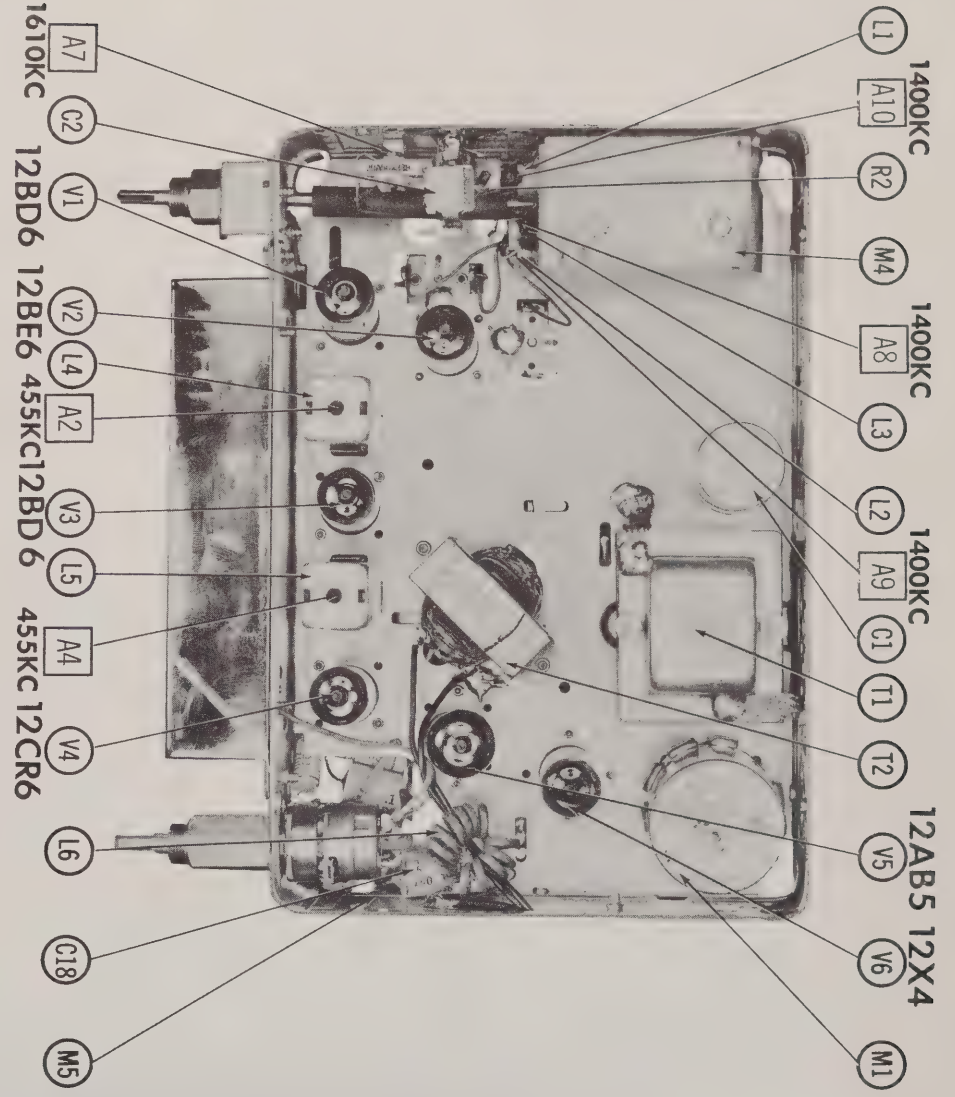
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	100K		6R6075	BTS-100K	
R3	1Meg		6R6004	BTS-1Meg	
R4	220Ω		6R6270	BTS-220	
R5	100K		6R6075	BTS-100K	
R6	47K		6R6056	BTS-47K	
R7	6800Ω	2	6R5690	BTB-6800	
R8	330Ω		6R6022	BTS-330	
R9	3.3Meg		6R2118	BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R10	15K		6R2119	BTS-15K	
R11	2.2Meg		6R3927	BTS-2.2Meg	
R12	1Meg		6R6004	BTS-1Meg	
R13	220K		6R6015	BTS-220K	
R14	270K		6R6414	BTS-270K	
R15	4.7Meg		6R2122	BTS-4.7Meg	
R16	270Ω		6R6432	BTS-270	
R17	2200Ω	2	6R476130	BTB-2200	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @1.5A	476VCT @.051A			25C521841					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5200Ω	3-4Ω	25B70171-P	Z1107	A-2930	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6" x 9"	PM	3-4Ω	50C537863	69A2	238S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	12Ω		24B537760				Note 1 (Part of M4)
L2	RF Coil	12Ω		24B502473				Note 1 (Part of M4)
L3	Osc. Coil	.6Ω	2.4Ω	24B502474				Note 1 (Part of M4)
L4	Input IF	17Ω	17Ω	24C485553	16-6758	BC-352	12-C1	
L5	Output IF	17Ω	17Ω	24K485554	16-6770	BC-355	12-C6	
L6	Fil. Choke	0Ω		24K580706				
L7	Vib. Hash Choke	0Ω		24A538447				19.8 Microhenries

Note 1. Tuner part #77D537759 uses part #24B537760 (L1), 24B502473 (L2), and 24B502474 (L3).
Tuner part #77K537768 uses part #24B537770 (L1), 24K536586 (L2), and 24K536595 (L3).

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6V	115~	48B522000	6301	G859	6301	

FUSES

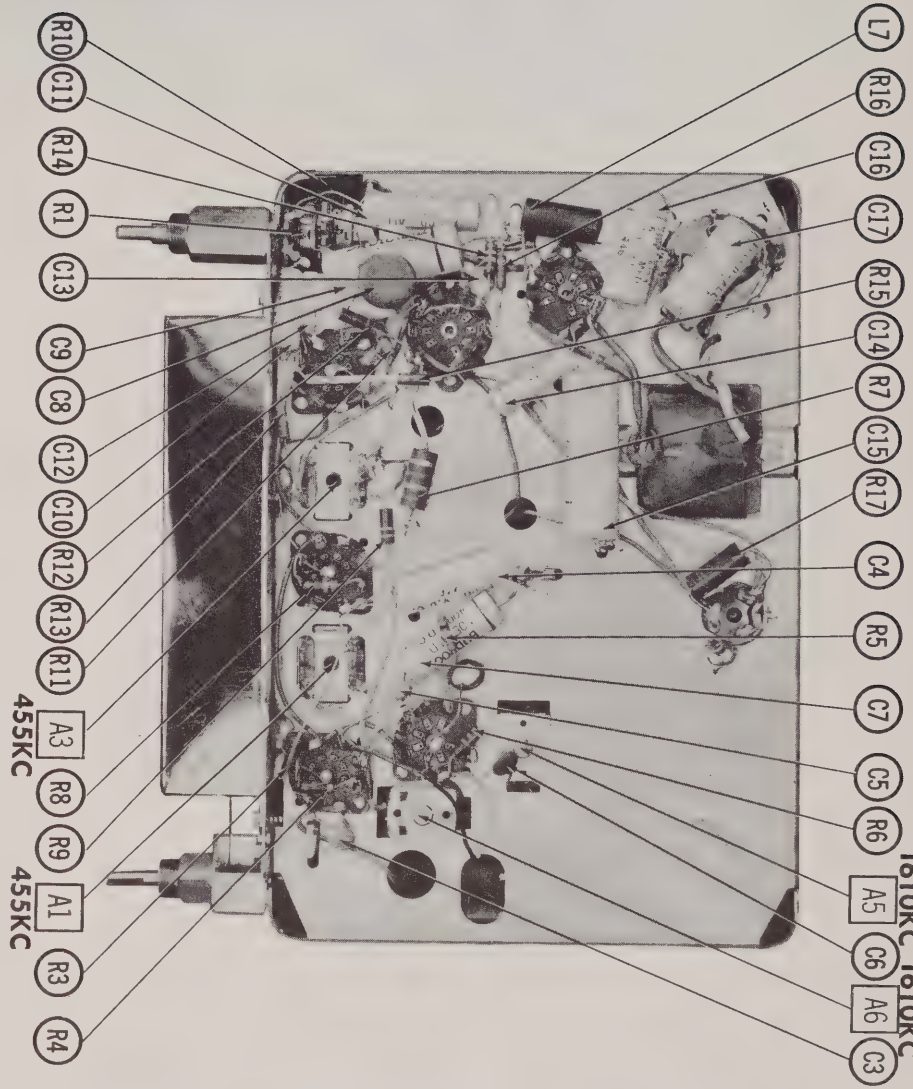
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	9A	65R16248		307009. (SFE9A)		SFE9	

MISCELLANEOUS

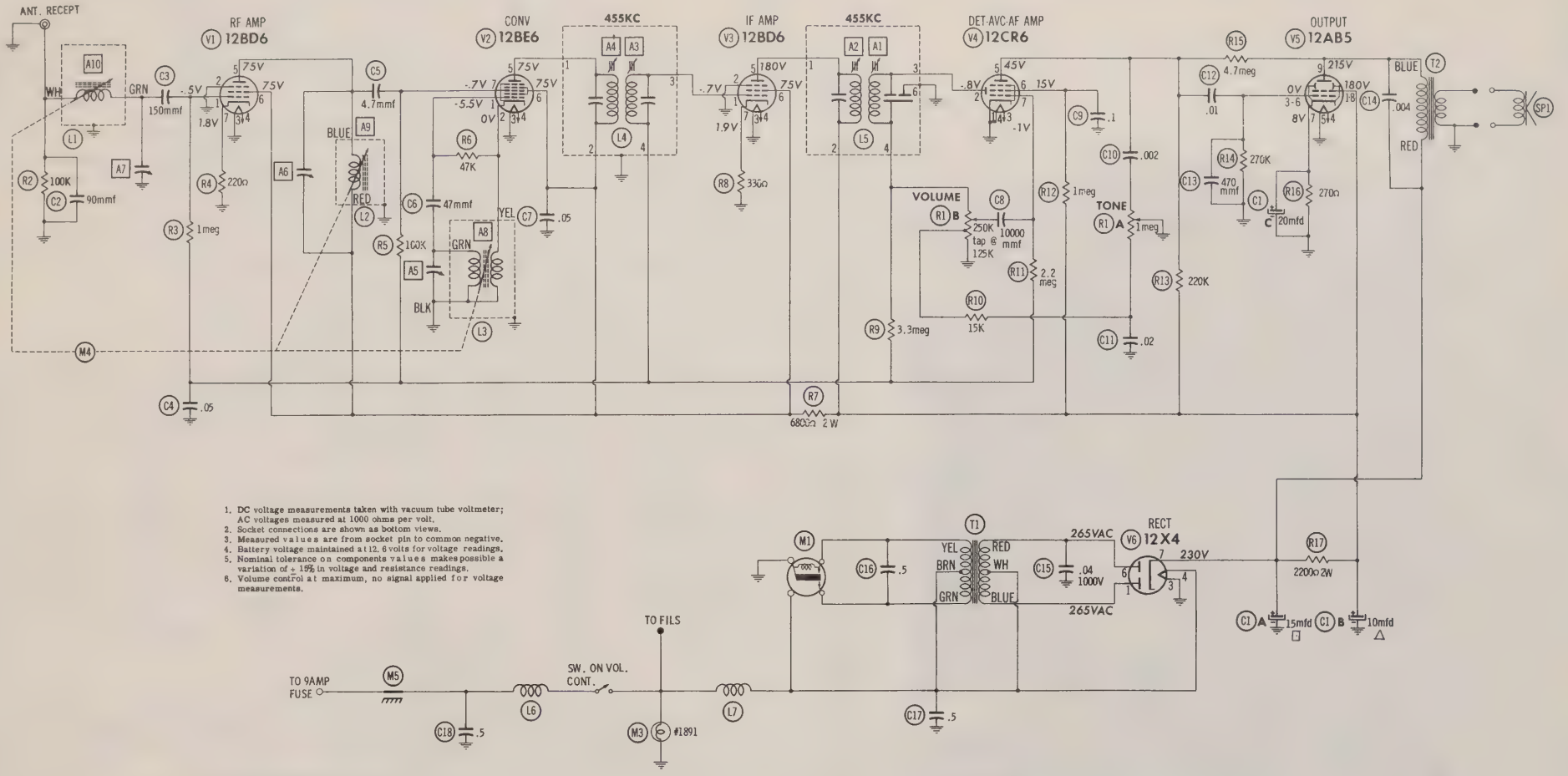
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Dial Light	65T533821	#1891
M4	Tuner	77D537758 *	Permeability (MT-185), Includes L1, L2, L3
M5	Spark Plate	64K532087	
A5	Trimmer Cap.	20A485708	Osc. (395-470MMF)
A6	Trimmer Cap.	20A481526	RF (20-180MMF)
A7	Trimmer Cap.	20K536723	Ant. (50-280MMF)
	Knob	36B534305	On-off-volume & tuning
	Knob	36B534306	Dummy
	Knob	36K534307	Tone
	Dial Pointer	52A536836	
	Dial Scale	34B536623	

* Alternate part #77D537759 (MT-186) or 77K537768 (MT-187).

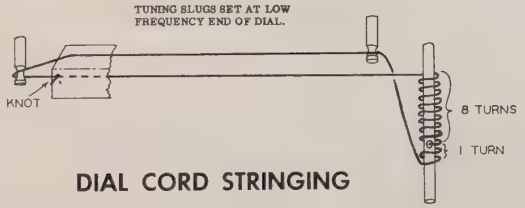
CHASSIS—BOTTOM VIEW



MOTOROLA MODEL CTM6



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



DIAL CORD STRINGING

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BD6	4.3Meg	0Ω	0Ω	.1Ω	†9000Ω	†9000Ω	220Ω		
V2	12BE6	47K	.6Ω	0Ω	.1Ω	†9000Ω	†9000Ω	3.4Meg		
V3	12BD6	3.3Meg	0Ω	0Ω	.1Ω	†2200Ω	†9000Ω	330Ω		
V4	12CR6	0Ω	200K	.1Ω	0Ω	†220K	†1Meg	5.4Meg		
V5	12AB5	†2200Ω	NC	270K	.1Ω	0Ω	270K	270Ω	NC	†400Ω
V6	12X4	350Ω	TP	0Ω	.1Ω	NC	330Ω	40K		

† MEASURED FROM PIN 7 OF V6.
TP TIE POINT
NC NO CONNECTION

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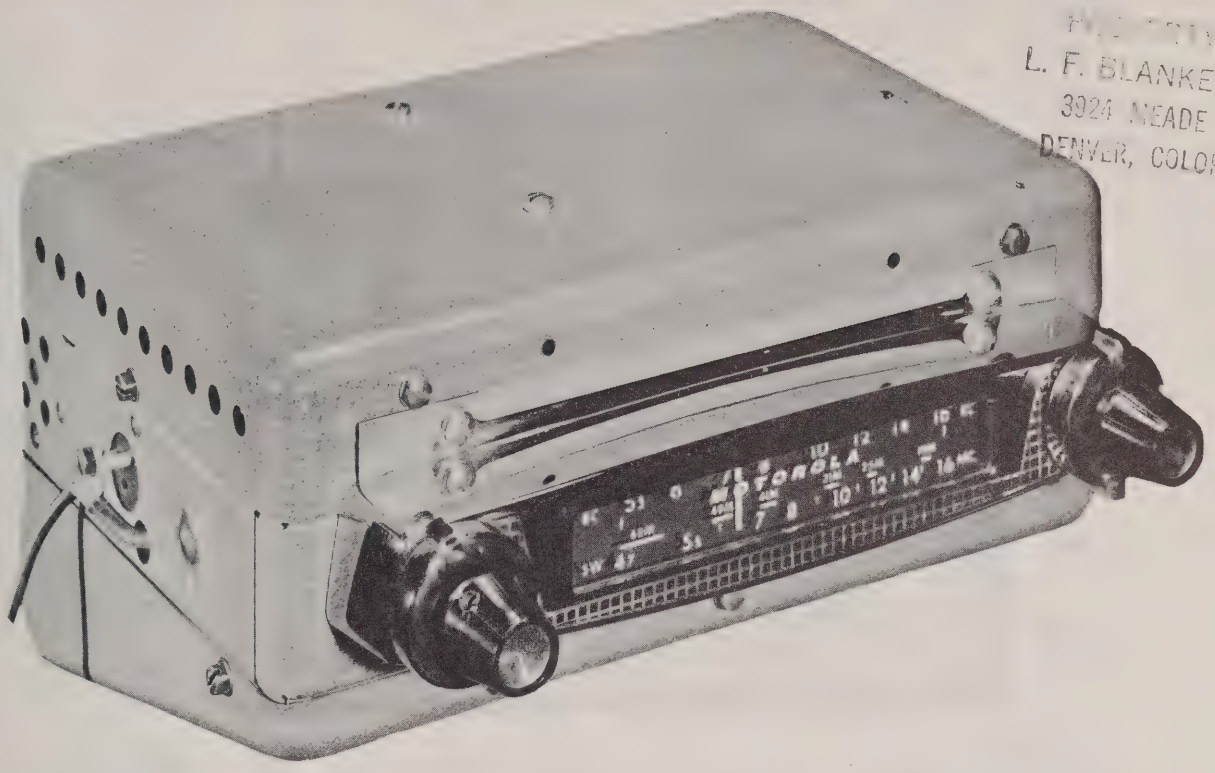
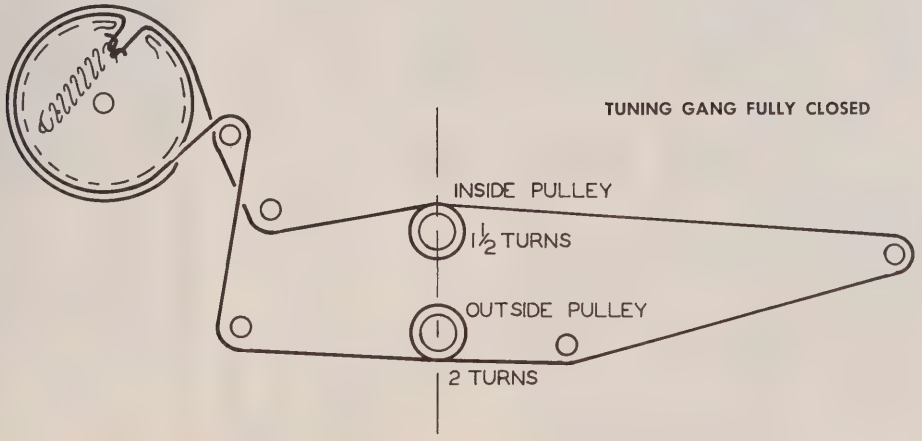
MOTOROLA
MODELS 506, 506-12



MOTOROLA
MODELS 506, 506-12

TRADE NAME	Motorola Models 506 (6 volt), 506-12 (12 volt)		
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.		
TYPE SET	Battery Operated Universal Type AM Superheterodyne Automobile Receiver		
TUBES (Six)	Types 6BA6 RF Amplifier, 6BE6 Converter, 6BA6 IF Amplifier, 6CR6 Det-AVC-AF Amp., 6AQ5 Output, 6X4 Rectifier (12 Volt Tube Types Used In Model 506-12)		
POWER SUPPLY	6 Volt Storage Battery (Model 506)	RATING	4.6 Amp. @ 6.3 Volts DC (Model 506)
TUNING RANGE—BROADCAST	535KC - 1620KC	SHORT WAVE	4.7MC - 16MC



DIAL CORD STRINGING

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BA6	Note 1
V2	Converter	6BE6	Note 1
V3	IF Amplifier	6BA6	Note 1
V4	Det-AVC-AF Amp.	6CR6	Note 1
V5	Output	6AQ5	Note 2
V6	Rectifier	6X4	Note 1

Note 1: 12 Volt equivalent type used in model 506-12.
Note 2: 12AB5 used in model 506-12.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■30	350	23A537477	AFH3-28-30		FP330. 7			TVL-3639. 8
B	▲20	350							
C	10	350							
C2	20	25	23A537476	PRS25V25	BR202	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	10000		21R482726	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C4	10000		21R482726	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C5	10000		21R482726	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C6	10000		21R482726	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C7	47		21R115593	N750-DI47	TCN-47	N033	N750K-470	NT-5447	5TCU-Q47	
C8	430		21K537475	1469-00043						
C9	2200		21K537698	1464-0022						
C10	10000		21R482726	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C11	10000		21R482726	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C12	10000		21R482726	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C13	. 05	400	8R121567	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C14	. 01	400	8R121002	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C15	470		21R114554	BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C16	. 005	400	8K122962	BPD-005	D6-502	PT625	GP2-333-502	PT625	6TM-D5	
C17A	300	}	21A522033							
B	300	}								
C18	. 02	1000	8R121004	P1088N-02		CUB16S2		PT1612	10TM-S2	Note 1
C19	. 5	100	8K122076	VHC36		ST2P5		RF480	68P20	
C20	. 5	100	8K122076	VHC36		ST2P5		RF480	68P20	Note 2
C21	. 5	100	8K122076	VHC36		ST2P5		RF480	68P20	

Note 1: Model 506-12 uses . 04MFD in this application.
Note 2: Not used in model 506.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250K	½	18B537159	AB-50	A47-250K-S	Q11-130	U46	Volume
B	Shaft		Not Req.	AK-23	RS-3/16	NQ	DS-37	Attach to R1A
C	Switch		Not Req.	KB-4	SWE-13	76-1	US-26	Attach to R1A

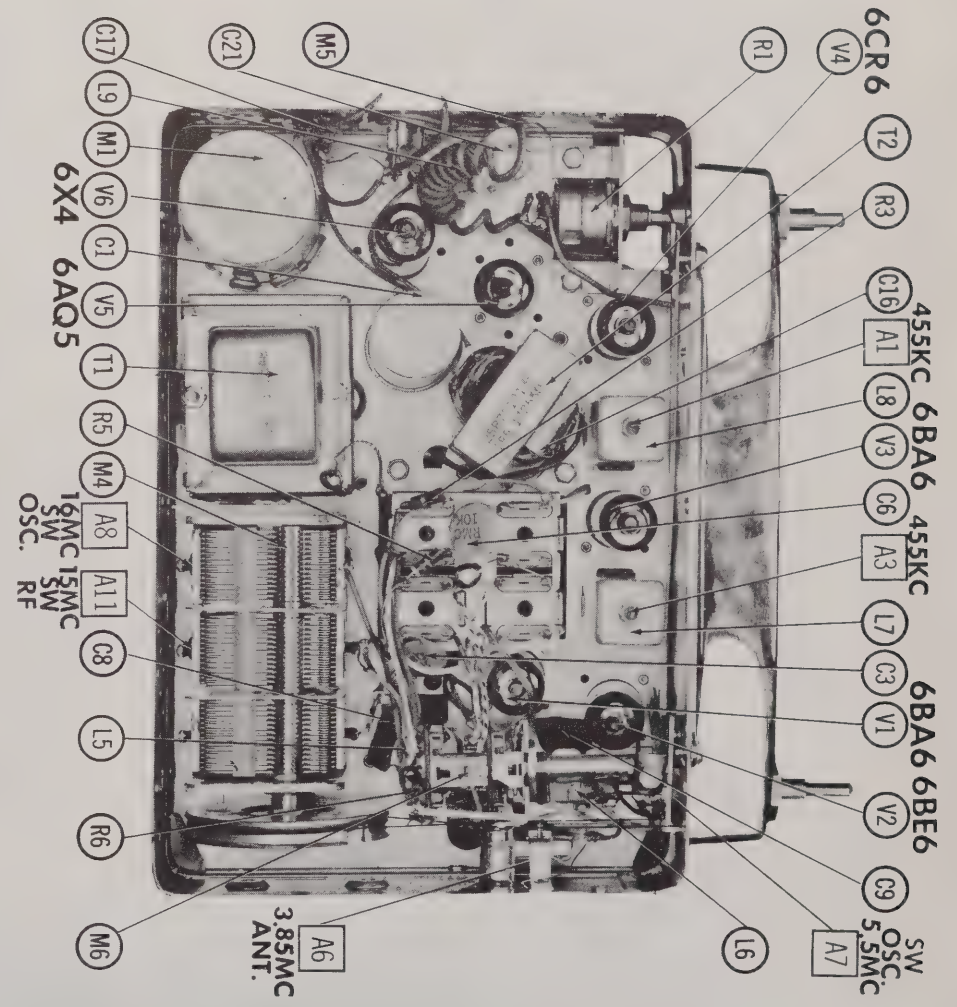
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MOTOROLA PART No.	IRC PART No.	NOTES
R2	100K		6R6075	BTS-100K	
R3	10K		6R6054	BTS-10K	
R4	68Ω		6R2039	BTS-68	
R5	470K		6R6032	BTS-470K	
R6	27Ω		6R5683	BTS-27	
R7	22K		6R6028	BTS-22K	
R8	15K	2	6R5732	BTB-15K	
R9	3900Ω	2	6R476012	BTB-3900	
R10	220Ω		6R6270	BTS-220	
R11	220Ω		6R6270	BTS-220	
R12	3. 3Meg		6R2118	BTS-3. 3Meg	
R13	2. 2Meg		6R3927	BTS-2. 2Meg	
R14	220K		6R6015	BTS-220K	
R15	1Meg		6R6004	BTS-1Meg	
R16	270K		6R6414	BTS-270K	
R17	270Ω		6R6432	BTS-270	
R18	1000Ω	3	17K537732	PW4-1000	
R19	56Ω	1	6R2037	BTA-56	Note 1
R20	56Ω	1	6R2037	BTA-56	Note 2

Note 1: Model 506-12 uses 27Ω 1W in this application. (part #6R5683)
Note 2: Not used in model 506-12.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	6.3VCT @ 3.5A	440VCT @ .040A			25C537164 ① 25C537165 ②					

① Used in model 506.
② Used in model 506-12.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5200Ω	3-4Ω	25B70171-P	Z1107	A-2930	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5" X 7"	PM	3-4Ω	50C522055			

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	BC Ant. Coil	32Ω	5.8Ω	24B537474				
L2	SW Ant. Coil	2Ω	.2Ω	24B537471				
L3	BC RF Coil	32Ω	5.8Ω	24B537473				Includes IF Trap - Trap Winding = 22Ω
L4	SW RF Coil	8Ω	.2Ω	24B537470				
L5	BC Osc. Coil	.5Ω	5.8Ω	24B537472				
L6	SW Osc. Coil	0Ω	.2Ω	24B537469				
L7	Input IF	16Ω	16Ω	24C632774	16-6758	BC-352	12-C1	
L8	Output IF	15Ω	15Ω	24K632775	16-6770	BC-355	12-C6	
L9	Fil. Choke	0Ω		24K580706				
L10	Vib. Hash Choke	0Ω		24A533673				

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115∿	48B3333	5342	903M	5342	Used in model 506.
M1	Interrupter	12.6V	115∿	48B522000	6301	G859	6301	Used in model 506-12.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2*	SFE	9A	65R16248	9C536545	307009. (SFE-9)	155009.	SFE9	HRH
M2♦	SFE	5A	65R122345	9K536617				

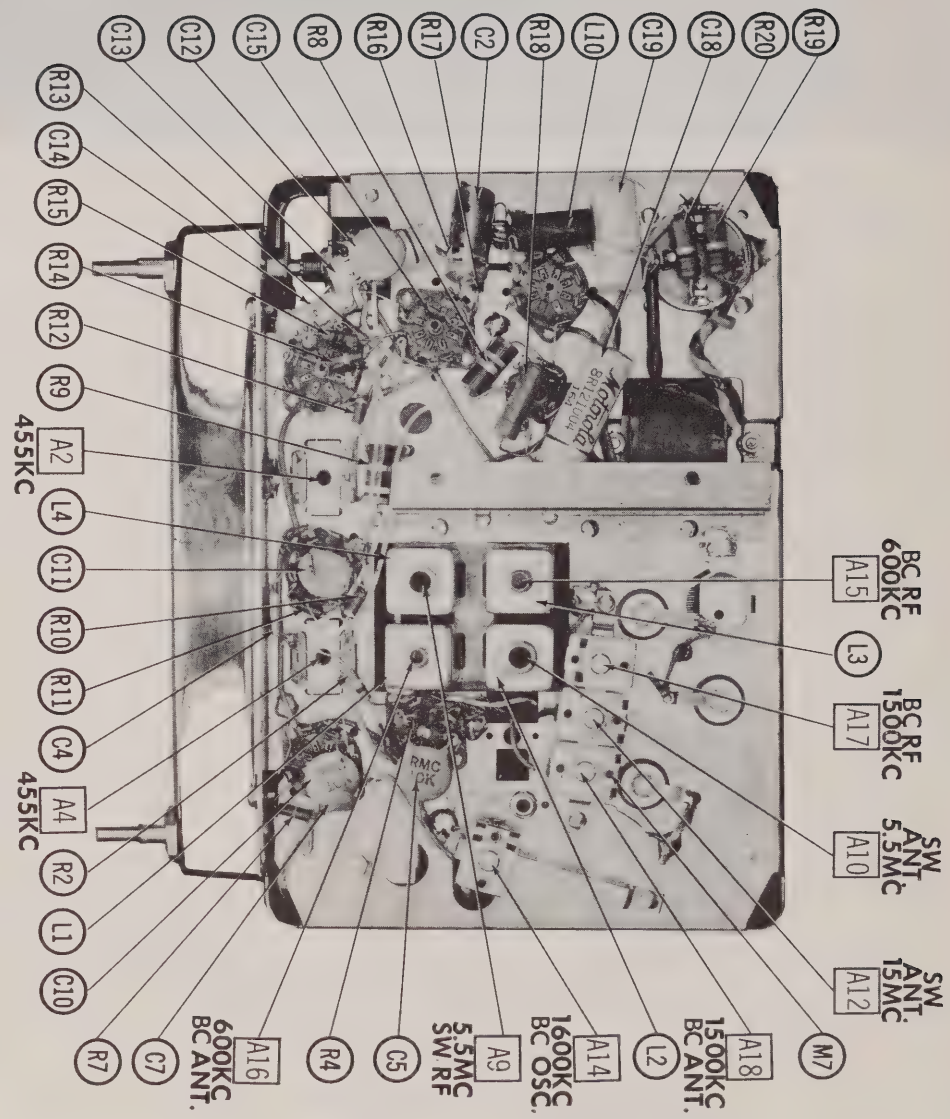
* Used in model 506.
♦ Used in model 506-12.

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Dial Lamp		#44 (Model 506) - #1891 (Model 506-12)
M4	Tuning Cap.	19C537146	3 Gang (21-495MMF, 21-495MMF, 21-495MMF)
M5	Spark Plate	64K532087	
M6	Switch	40C537119	Band Selector, 2 Gang (Rotary, Wafer Type)
M7	Capacitor Ass'y.	*20B537161	RF Trimmer A18 (3-50MMF), RF Trimmer A12 (3-50MMF), Mixer Trimmer A17 (3-50MMF). Includes bracket.
A6	Ant. Trimmer	20B537163	20-130MMF (Includes Bracket)
A14	BC Osc. Trimmer	♦20K537162	5-50MMF (Includes Bracket)
	Knob	36K537731	Band Spread
	Knob Lever	36K473550	Band Switch or Tuning
	Knob	36B522008	On-Off-Volume
	Dial Escutcheon	13D521747	

* Alternate part #20B537166.
♦ Alternate part #20K537167.

CHASSIS—BOTTOM VIEW



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Fig. 1	Thru dummy to antenna receptacle.	455KC (400∿ Mod)	BC	Tuning gang fully closed.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	"	"	"	"	A5	Adjust for MINIMUM output. Replace cover.
3.	"	"	3.85MC	SW	"	VTVM DC probe to point (A). Common to chassis.	A6	Adjust for maximum deflection.
4.	"	"	5.5MC	"	5.5MC	Output meter across voice coil.	A7	Adjust bandspread control so that it is one (1) full turn (counter clockwise) from extreme clockwise position. Adjust A7 for maximum output. With tuning gang fully closed, check frequency of receiver. If above 4.7MC or lower than 4.6MC, adjust A7 so that receiver frequency is between 4.7MC and 4.6MC.
5.	"	"	16MC	"	16MC	"	A8	With A8 fully clockwise, slowly turn counter clockwise until second response is heard. Repeat steps 4 and 5.
6.	"	"	5.5MC	"	Tune to 5.5MC signal.	"	A9, A10	Adjust for maximum output.
7.	"	"	15MC	"	15MC	"	A11, A12	Adjust for maximum output while rocking tuning gang. Repeat steps 6 and 7.
8.	"	"	600KC	BC	600KC	"	A13	Adjust for maximum output. With tuning gang fully closed, check frequency of receiver. If above 540KC or below 530KC adjust A13 so that receiver is between 540KC and 530KC.
9.	"	"	1600KC	"	1600KC	"	A14	With A14 fully clockwise, slowly turn counter clockwise until response is heard. Repeat steps 8 and 9.
10.	"	"	600KC	"	Tune to 600KC signal.	"	A15, A16	Adjust for maximum output.
11.	"	"	1500KC	"	Tune to 1500KC signal.	"	A17, A18	"

With receiver installed in car and antenna fully extended, tune to weak station near 5.5MC (SW) or 600KC (BC). If there is no station at either frequency, receiver noise may be used.
Turn antenna trimmer (A6) counter clockwise (but not out of threads) until no increase in output is noticed. Turn antenna trimmer (A6) slowly clockwise until slight decrease in output is noticed. Leave trimmer (A6) set at this point as this is a broad adjustment.

DIAL POINTER CALIBRATION

If necessary, adjust pointer so that right edge of pointer lines up with left edge of vertical calibration mark at low side of dial.

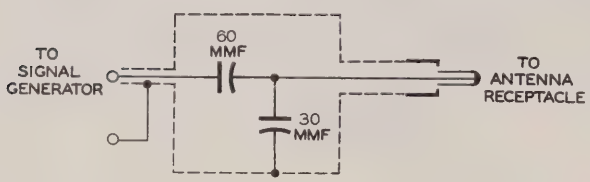
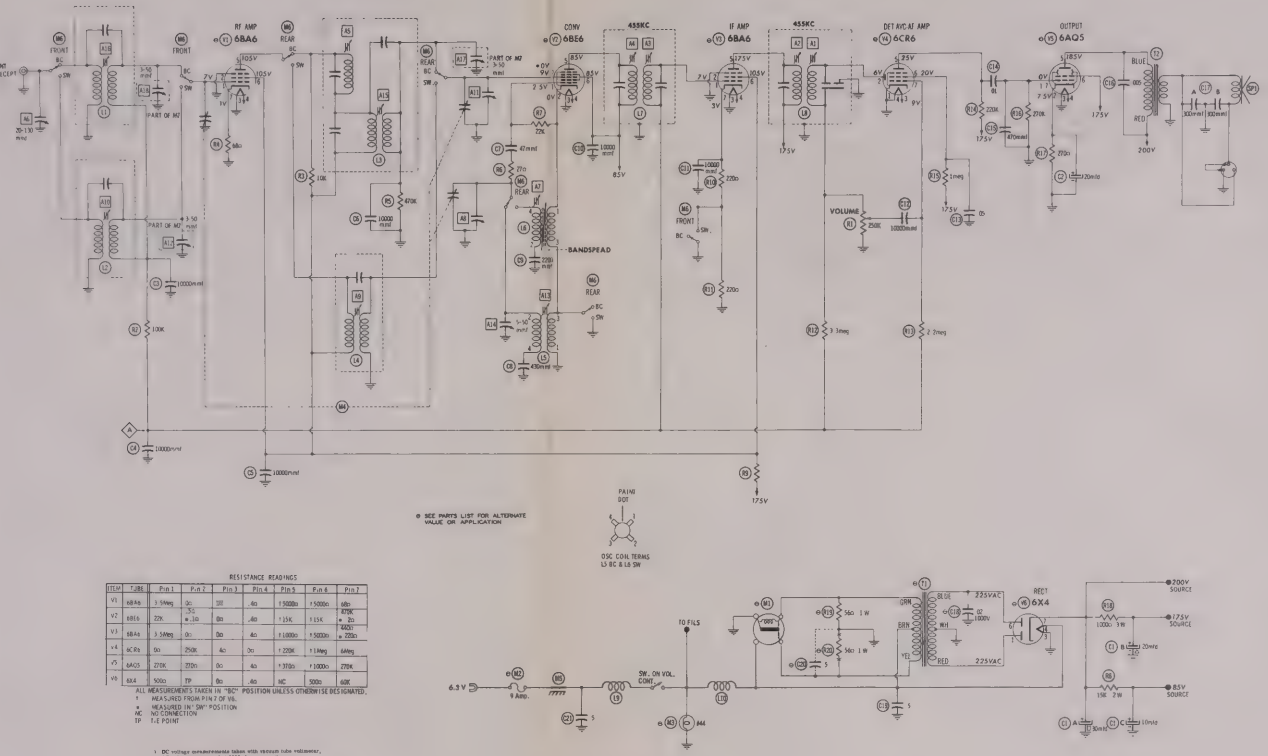


FIG. 1



* SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6BA6	3.5Meg	0Ω	18K	4Ω	†500Ω	†500Ω	68Ω
V2	6BE6	22K	3Ω ±.1Ω	0Ω	4Ω	†15K	†15K	470K ± 20Ω
V3	6BA6	3.5Meg	0Ω	0Ω	4Ω	†1000Ω	†500Ω	1000 ± 200Ω
V4	6CR6	0Ω	250K	4Ω	0Ω	†220K	†1Meg	6Meg
V5	6AQ5	270K	270Ω	0Ω	4Ω	†370Ω	†1000Ω	270K
V6	6X4	500Ω	TP	0Ω	4Ω	NC	500Ω	60K

ALL MEASUREMENTS TAKEN IN "BC" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM PIN 7 OF V6.
* MEASURED IN "SW" POSITION
NC NO CONNECTION
TP T-E POINT

1 DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2 Socket connections are shown as bottom views
3 Measured values are from socket pin to common negative
4 Battery voltage maintained at 6.3 volts for voltage readings.
5 Tolerance of values on components other than those possible variables is ± 10% in voltage and resistance readings
6 Readings are with a multimeter. See manual applicable for voltage measurements

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OLYMPIC MODEL 1TC12 (Ch. "CC")

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TRADE NAME	Olympic	MODELS	CHASSIS
		1CC22, 1CC23, 1KC41, 1KC42, 1KC43, 1TC12	"CC"
		1CD24, 1CD25, 1TD13	"CD"
		4CG26, 4CG27, 4KG44, 4KG45	"CG"
		4CH28, 4CH29	"CH"
MANUFACTURER	Olympic Radio & Television Inc., 34-01 38th. Ave., Long Island City, 1, N.Y.		
TYPE SET	Television Receiver		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.45 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)		

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.

2. Remove 2 wood screws holding name plate on front of cabinet.

3. Remove 4 push-on type control knobs now exposed by removal of name plate.

4. Remove 2 metal screws. Remove rear cover.

5. Disconnect speaker plug.

6. Remove 4 chassis bolts. Remove chassis.

7. Remove 2 speaker nuts. Remove speaker.

MODEL	CHASSIS
1TC12	"CC"

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 wood screws holding wood strip at top edge of the safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal frequency slug may be made the rear panel of the receiver. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the chassis. Adjust the buzz control (R8) for maximum volume and MINIMUM buzz.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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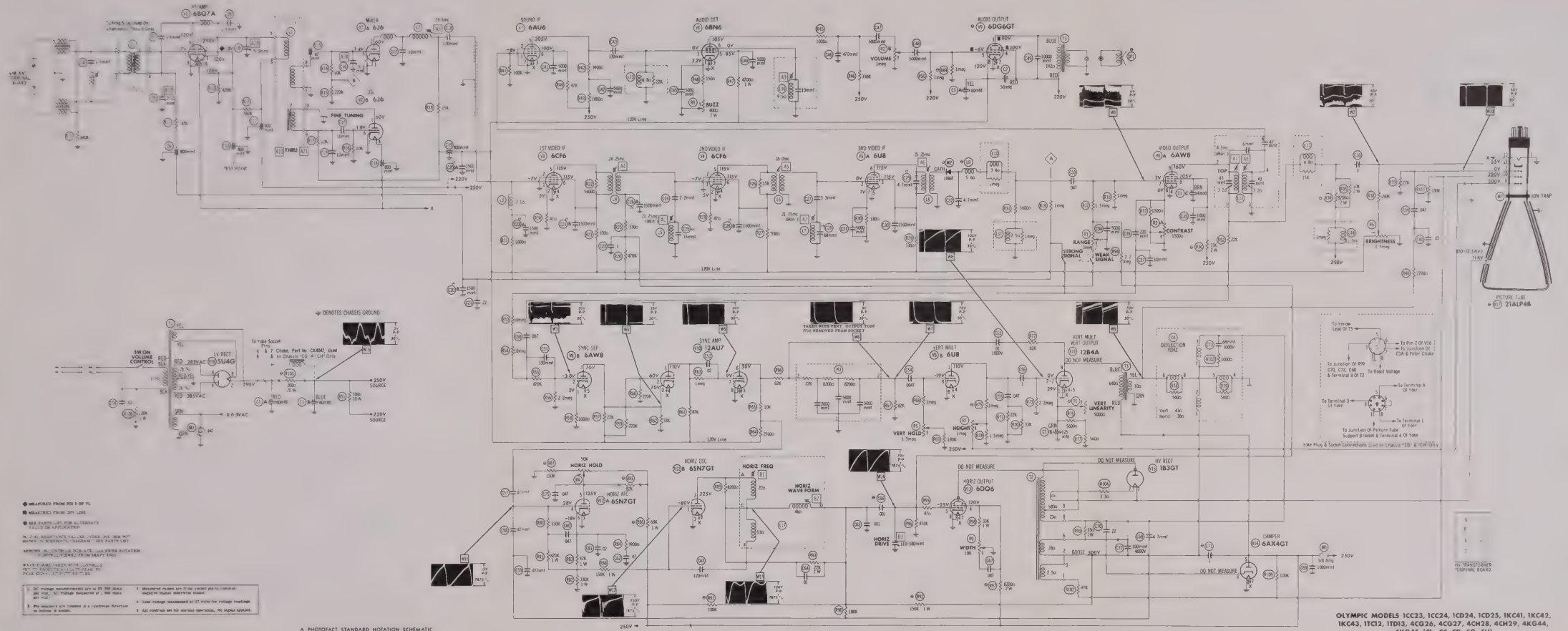
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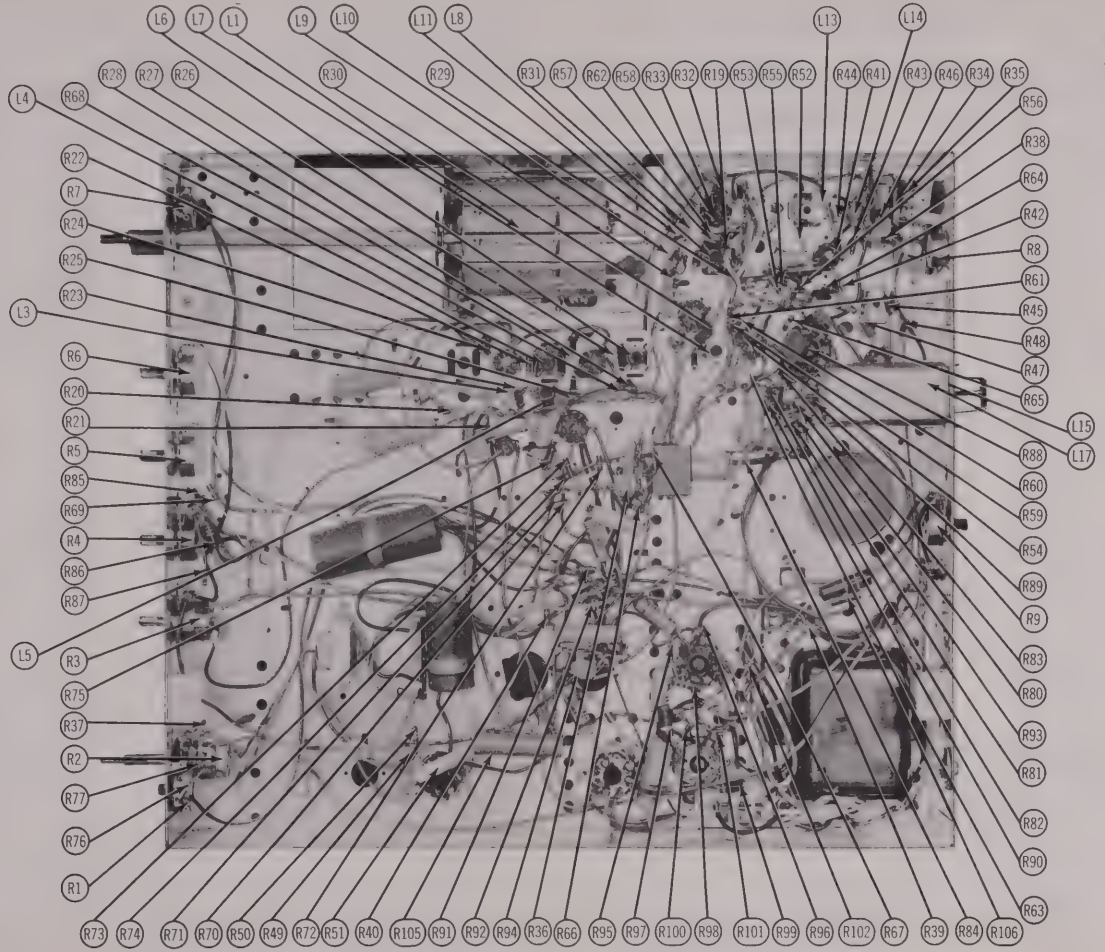
OLYMPIC MODELS 1CC23, 1CC24, 1CD24, 1CD25, 1KC41, 1KC42, 1KC43, 1TC12, 1TD13, 4CG26, 4CG27, 4CH28, 4CH29, 4KG44, 4KG45 (Ch. CC, CD, CG, CH)



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

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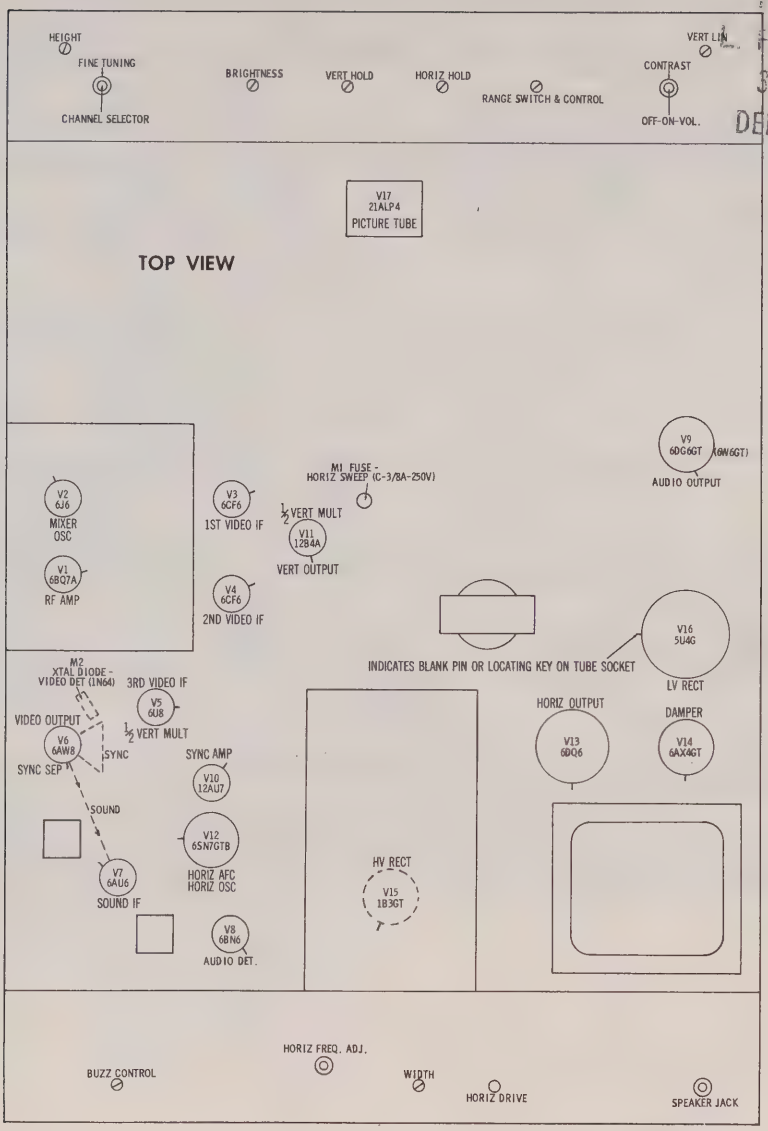
OLYMPIC MODELS 1CC23, 1CC24, 1CD24, 1CD25, 1KC41, 1KC42, 1KC43, 1TC12, 1TD13, 4CC26, 4CG27, 4CH28, 4CH29, 4KG44, 4KG45 (Ch. CC, CD, CG, CM)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V16**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V17**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V5, V10, V11**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V6, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V17, Fuse (M1)**
No vertical deflection - **V5, V11**
Poor vert. linearity or foldover - **V5, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, V16**
Vert. off freq. - **V5, V10, V11**
Horiz. off freq. - **V10, V12**

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal oscillator tube (V12) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Use lowest DC scale on VTVM.
If oscillation occurs during alignment (varing signal generator output will have no effect on VTVM reading) detune A6 and adjust A4 and A5 as in steps 3 and 4, then adjust A6 as in step 5.
In step 6 use only enough sweep generator output for usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	Not used.	21.75MC (unmod)	Any	USE VTVM DC probe thru 100K to point (A). Common to chassis.	A1, A2	Adjust for MINIMUM deflection.
2.	"	"	"	23.5MC	"	"	A3	Adjust for maximum deflection.
3.	"	"	"	24.25MC	"	"	A4	"
4.	"	"	"	26.0MC	"	"	A5	"
5.	"	"	"	25.25MC	"	"	A6	"
6.	"	"	24MC (10MC Swp)	21.75MC 23.25MC 26.25MC 27.75MC	"	Vert. amp. to point (A). Low side to chassis.		Connect negative lead of 1.5 volt battery to the ungrounded side of C21. Positive to chassis. Check for response similar to Fig. 1. If necessary, SLIGHTLY retouch A3 and A5. A5 affects the high frequency side of the curve and A3 affects the low frequency side.

4.5MC TRAP ALIGNMENT

Remove the 3rd Video IF Amplifier tube (V5) from its socket.
Set contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (unmod)	ANY	DC probe thru detector (Fig. 2) to pin 11 (cathode) of picture tube. Common to chassis.	A7	Adjust for MINIMUM deflection. Use maximum signal generator output. Replace V5 in its socket.

ALTERNATE 4.5MC TRAP ALIGNMENT

Replace original 6J6 in its socket and tune in a local TV station. Adjust fine tuning control to emphasize 4.5MC beat interference in picture. Adjust A7 to minimize the 4.5MC beat in the picture.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Connect the DC probe of a VTVM to pin 2 of the audio detector tube (V8). Common to chassis. Replace the original 6J6 in its socket. Turn set on and tune in a strong TV signal. Adjust A8 for maximum deflection on VTVM. Disconnect VTVM from receiver. Set the buzz control (R8) to its mid-range position. Adjust the quadrature coil slug A9 for maximum volume. Adjust R8 for maximum volume with minimum buzz. Retouch A8 for maximum volume.

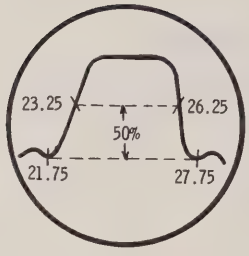


FIG. 1

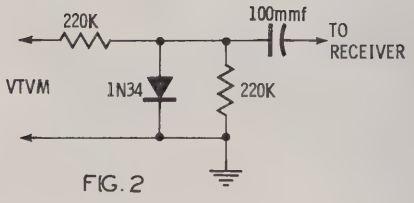


FIG. 2

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Connect bias as in step 6 of "Video IF Alignment".
The channel oscillator adjustment screws are reached through a hole just above the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω carbon resistors	Across antenna terminal with 120Ω in each lead.	213MC (10MC Swp)	211. 25MC 215. 75MC	13	Vert. amp. thru 10K to point (A). Low side to chassis.	A10	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should be at 50%.
			207MC (10MC Swp)	205. 25MC 209. 75MC	12		A11	
			201MC (10MC Swp)	199. 25MC 203. 75MC	11		A12	
			195MC (10MC Swp)	193. 25MC 197. 75MC	10		A13	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A14	
			183MC (10MC Swp)	181. 25MC 185. 75MC	8		A15	
			177MC (10MC Swp)	175. 25MC 179. 75MC	7		A16	
			85MC (10MC Swp)	83. 25MC 87. 75MC	6		A17	
			79MC (10MC Swp)	77. 25MC 81. 75MC	5		A18	
			69MC (10MC Swp)	67. 25MC 71. 75MC	4		A19	
			63MC (10MC Swp)	61. 25MC 65. 75MC	3		A20	
			57MC (10MC Swp)	55. 25MC 59. 75MC	2		A21	

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω carbon resistors	Across antenna terminal with 120Ω in each lead.	207MC (10MC Swp)	205. 25MC 209. 75MC	12	Vert. amp. thru 10K to point (B). Low side to chassis.	A22, A23, A24	Adjust for response curve similar to Fig. 4 with markers above 90%.
10.	"	"	213MC (10MC Swp)	211. 25MC 215. 75MC	13	"		Check for response curve similar to Fig. 4. If markers fall below 70% on any channel, make compromise adjustment of A22, A23 and A24 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp)	55. 25MC 59. 75MC	2			

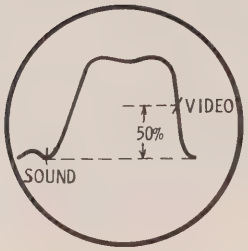


FIG. 3

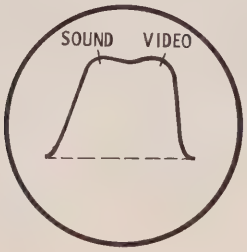


FIG. 4

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	† 200Ω	300K	INF	0Ω	.1Ω	INF	1Meg	0Ω	300K
V2	6J6	■ 10K	■ 15K	0Ω	.1Ω	230K	10K	0Ω		
V3	6CF6	1Meg	47Ω	0Ω	.1Ω	■ 330Ω	■ 330Ω	0Ω		
V4	6CF6	1.5Meg	47Ω	0Ω	.1Ω	■ 330Ω	■ 330Ω	0Ω		
V5	6U8	● *1.3Meg	.3Ω	■ 330Ω	.1Ω	0Ω	■ 330Ω	180Ω	0Ω	● 1.5Meg
V6	6AW8	1000Ω	2Meg	■ 18K	0Ω	.1Ω	● 25Ω	600K	† 33K	† 4500Ω
V7	6AU6	100K	0Ω	.1Ω	0Ω	† 5000Ω	† 47K	0Ω		
V8	6BN6	350Ω	6.8Ω	.1Ω	0Ω	■ 4700Ω	9.5Ω	† 330K		
V9	6DG6GT	TP	0Ω	† 1000Ω	† 900Ω	500K	NC	.1Ω	30K	
V10	12AU7	■ 47K	100K	■ 18K	.1Ω	.1Ω	■ 13K	1Meg	0Ω	0Ω
V11	12B4A	● 1300Ω	2.2Meg	0Ω	.1Ω	.1Ω	TP	2.2Meg	TP	† 850Ω
V12	6SN7GT	450K	† 70K	0Ω	1.5Meg	† 50K	400K	0Ω	.1Ω	
V13	6DG6	TP	0Ω	TP	† 9K	350K	TP	.1Ω	0Ω	TOP CAP *42Ω
V14	6AX4GT	NC	NC	100K	NC	† 200Ω	NC	.1Ω	0Ω	
V15	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			TOP CAP *620Ω
V16	5U4G	NC	30K	TP	27Ω	TP	29Ω	NC	30K	
V17	21ALP4A	0Ω	22K	Pin 6 *17Ω	Pin 10 *47K	Pin 11 ● ■ 350K	Pin 12 .1Ω			

RANGE SWITCH IN MAXIMUM COUNTERCLOCKWISE POSITION.

† MEASURED FROM PIN 2 OF V16.

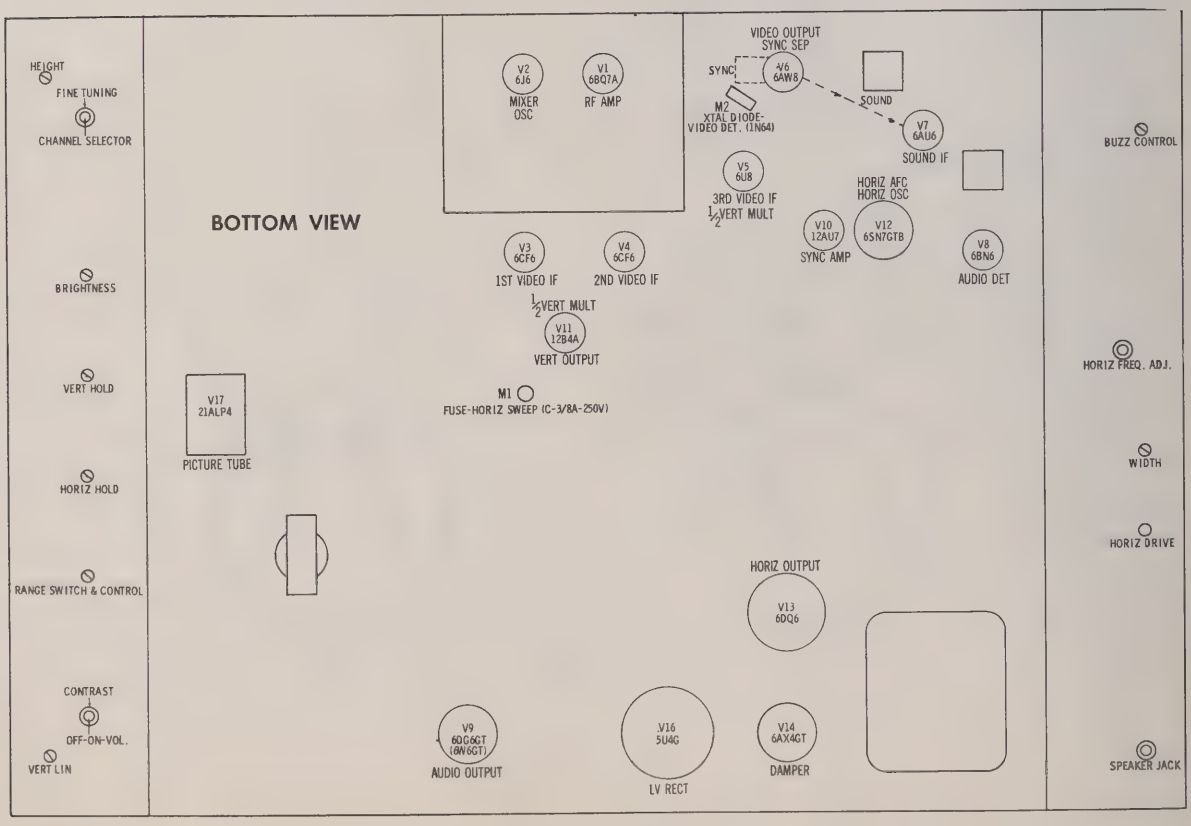
■ MEASURED FROM 120V LINE.

* MEASURED FROM PIN 3 OF V14.

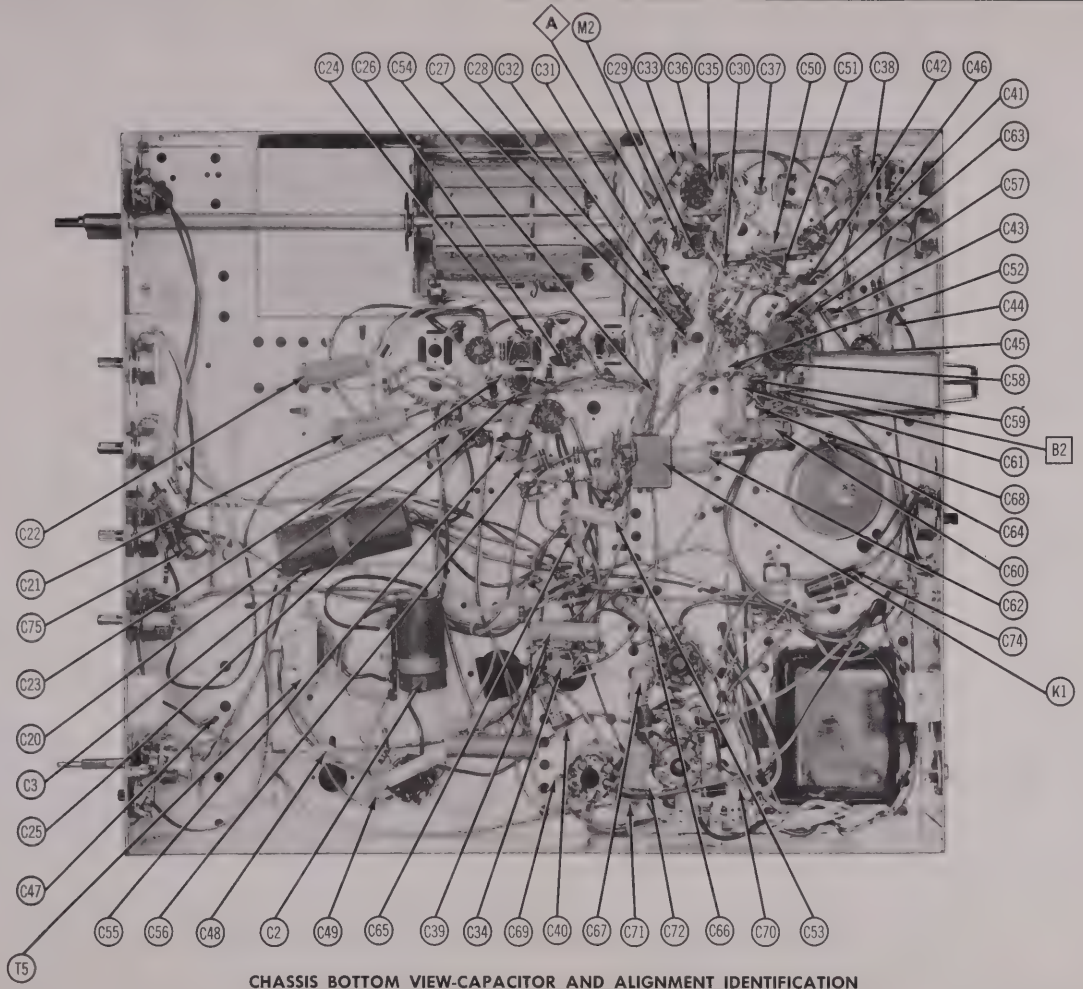
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

TP TIE POINT

NC NO CONNECTION



TUBE PLACEMENT CHART



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

...SAFETY OF
...NKENSHIP
...S.
...COLOR.DO

OLYMPIC MODELS 1CC23, 1CC24, 1CD24, 1CD25, 1EC41, 1EC42, 1KC43, 1TC12, 1TD13, 4CG26, 4CG27, 4CH28, 4CH29, 4KG44, 4KG45 (Ch. CC, CD, CG, CH)

PROPERTY OF
L. T. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS TOP VIEW

OLYMPIC MODELS 1CC23, 1CC24, 1CD24, 1CD25, 1KC41, 1KC42, 1KC43, 1TC12, 1TD13, 4CG26, 4CG27, 4CH28, 4CH29, 4KG44, 4KG45 (CH. CC, CD, CG, CH)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amp.	6BQ7A	
V2	Mixer-Osc.	6J6	
V3	1st Video IF Amp.	6CF6	
V4	2nd Video IF Amp.	6CF6	
V5	3rd Video IF Amp. - Vert. Multi.	12B4A	
V6	Video Output. - Sync sep	6AW8	
V7	Sound IF Amp.	6AU8	
V8	Audio Det.	6BN8	
V9	Audio Output	6DQ8GT	Note 1
V10	Sync Amplifier	12AU7	
V11	Vert. Mult. - Vert. Output	12B4A	
V12	Horiz. AFC-Horiz. Osc.	6SN7GT	
V13	Horiz Output	6DQ6	
V14	Damper	6A3/6CU	
V15	HV Rectifier	1B3GT	
V16	LV Rectifier	6U4G	

Note 1. 6W8GT may be used in some versions.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				
	OLYMPIC PART No	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	NOTES
V17	21ALP4B	21ALP4B ①	21ALP4A/B ①	21ALP4A/B ①	① Aluminized ② Silver Screen "85"
		21ALP4A ①	21ALP4A ①	21ALP4A ①	
		21ALP4	21ALP4		
	24CP4A	24CP4A	24CP4A ①		
		24TP4/ 24CP4A ①			

ELECTROLYTIC CAPACITORS

ITEM No	RATING			REPLACEMENT DATA				
	CAP	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	350	CO3380	PR3-025	3034	WT 460		T-10	R3085*
B	60	150			BR435			MT-4504	
C	4	350							
C2	50	350	CO3268-1	PRS250V50	BR5025	TC59	TD-50-250	FM-2540	TVA-1713
C3A	60	200	CO3256	PR3-200	BO88	WD340		FMD-4530	R2064*
B	125	50						MTH-5010	

* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	1.5			NPO-SIL 5	TCZ-1R5	2204	NPOA-1R5	Z7-5515	5TCCB-V15	
C5	2-10				829-10					
C6	800									
C7	5.1				829-2		315-01-0R5	CT555A		
C8	5-3			NPO-SIL 5	TCZ-1R5	2204	NPOA-1R5	Z7-5515	5TCCB-V15	
C9	1.5									
C10	800									
C11	800									
C12	10									
C13	10									
C14	800									
C15	47				829-3		315-01-0R5	CT555A		
C16	5-3			NPO-DI0	TCZ-10	2218	NPOA-100	Z7-541	5TCC-Q2	
C17	10			NPO-DI20	DD-121	T233	811-131		5TCC-71	
C18	120									
C19	800									
C20A	1500		CCD2D152X	BPD-2X0015	DD2-102	DK07I	821-0015	DCD5215	5HK-2D15	Note 1
B	1500									Note 1
C21	.23	900		P2S8N-23		CUB2P23		PT4023	2TM-P23	
C22	1	600		P4S8N-1	DF-104	CUB4P1		PT404	4TM-P1	
C23A	1500		CCD2D152X	BPD-2X0015	DD2-102	DK07I	821-0015	DCD5215	5HK-2D15	Note 1
B	1500									Note 1
C24	2.2			NPO-SI2.2	TCZ-2R2	T205	NPOA-2R2		5TCCB-V22	
C25	33			NPO-SI33	TCZ33	T218	NPOL-330	Z7-5433	5TCC-Q33	Note 2
C26A	1500		CCD2D152X	BPD-2X0015	DD2-102	DK07I	821-0015	DCD5215	5HK-2D15	Note 1
B	1500									Note 1
C27	3.3		CC8488	NPO-SI3.3	TCZ-3R3	TZ06	NPOA-3R3	Z7-5533	5TCCB-V33	
C28	68			N750-D68	TCN-68	N038	N750L-680		5TCU-Q68	Note 2
C29	4.7		CC0283	NPO-SI4.7	TCZ-4R7	TZ07	NPOA-4R7	Z7-5547	5TCCB-V47	Note 3
C30	1500			BPD-0015	DD-121	T233	811-0015	DCD5215	5HK-2D15	
C31	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C32	4.7		CC0283	NPO-SI4.7	TCZ-4R7	TZ07	NPOA-4R7	Z7-5547	5TCCB-V47	
C33	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C34	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C35	1000		CCD-102X	BPD-001	DD-103	K069	801-001	DC531	5HK-D1	
C36	220		CCD-221M							
C37	10		CCD-100X	NPO-DI0	DD-100	T018	831-100	Z7-541	5TCC-Q4	
C38	.1	400		P4S8N-1	DF-104	CUB4P1		PT404	4TM-P1	
C39	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C40	.02	400		BPD-02	DF-303	CUB4S3	817-02	PT423	4TM-S3	
C41	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C42	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C43	330		CCD-331M	DD-00333	DD-331	G086	811-331	UC-5333	5GA-T33	
C44	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C45	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C46	470		CCD-471M	BPD-00047	DD-471	G085	811-470	UC-5347	5GA-T47	
C47	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C48	5000		CCD-502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C49	10000		CCD-103X	BPD-01	DD-103	K069	811-01	DC531	5HK-S1	
C50	.002	600		BPD-002	DD-203	CUB4D2	GPS-333-203	PT632	6TM-D2	
C51	.033		CCD-333M	BPD-00033	DD-331	G096	811-331	UC-5333	5GA-T33	
C52	.02	400		BPD-02	DF-303	CUB4S3	817-03	PT423	4TM-S3	
C53	1000			PD08M-01	DD08-103	CUB3S1		PT1B1	1GTM-S1	
C54	.0047	600		1494-0047		1R3D47			M3-347	
C55	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C56	.1			P4S8N-1	DF-104	CUB4P1		PT401	4TM-P1	
C57	.47	500		NPO-SI47	DS-470	221R5Q47	831-470	Z7-5547	M3-447	
C58	.47	500		NPO-SI47	DS-470	221R5Q47	831-470	Z7-5547	M3-447	
C59	.47	500		NPO-SI47	DS-470	221R5Q47	831-470	Z7-5547	M3-447	
C60	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C61	.02	400		BPD-02	DF-303	CUB4S3	817-02	PT423	4TM-S3	
C62	.47	500		P2S8N-47		CUB2S47		PT2047	2TM-P47	
C63	130	500		NPO-SIL30	TCZ-130	221R5T131	831-131		M3-131	
C64	.01	600								
C65	.001	600		1494-001		1R5D1	811-102	MCB255	M3-21	
C66	.001	600		1494-001		1R5D1	811-102	MCB255	M3-21	Note 4
C67	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C68	4.7		CC0283	NPO-SI4.7	TCZ-4R7	TZ07	NPOA-4R7	Z7-5547	5TCCB-V47	
C69	1000		CCD-102X	BPD-001	DD-103	K069	801-001	DC531	5HK-D1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C70	.22	300		P2S8N-.22		CUB2P22		PT4022	2TM-P22	
C71	.1	400		P4S8N-1		CUB4P1		PT401	4TM-P1	
C72	100	4000	CO4545	HVD-80-100	DF-104	CUB4P1			80GA-T1	Note 5
C73	68	5000	CO4012	HVD-50-68	DD30-680	VST1	3KV-680	DC30468	30GA-Q68	
C74	01	600		BPD-01	DD-103	CUB4S1	GPS-333-103	PT631	6TM-S1	
C75	047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

Note 1: Some versions may use individual units in this application.
Note 2: Some versions may use 33MMF in this application. Others may use 47MMF in this application.
Note 3. Not used in some versions.
Note 4: Chassis CG and CH use 680MMF in this application.
Note 5: Chassis CG and CH use .33MFD in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5000 Ω	½	PT-3S3S	BX-10	A47-5000-S	Q11-114	TA33L	Vert. Linearity (Note 1)
B	Shaft		Not Req.	Not Req.	FSG-1/4	NQ	Not Req.	Attach to R1A
R2A	1500Ω	½	PT-3T74-1	F1-7	RTV-198	*Q2-604	UF152R	Contrast (Panel)
B	1Meg	½		RS-53			UR18A ↑↑	Volume (Rear)
C	Switch			KB-1			UB-36	Attach to R3B
R3A	3Meg	½	PT-4338	AB-54	A47-3Meg-S	Q11-123	UB9	Range
B	Shaft		Not Req.	AK-4	KBS-3		Not Req.	Attach to R3A
C	Switch		Not Req.	KB-3	SWE-21		UB-38	Attach to R3A
R4A	5MΩ	½	PT-3S17	AB-51	A47-50K-S	Q11-133	U15	Horiz. Hold
B	Shaft		Not Req.	AK-4	KBS-3	Not Req.	Not Req.	Attach to R4A
R5A	1. 5Meg	½	PT-3S6-1	AB-743	A47-1.5Meg-S	Q11-138	U18S	Vert. Hold
B	Shaft		Not Req.	AK-4	KBS-3	Not Req.	Not Req.	Attach to R5A
R6A	1. 5Meg	½	PT-3S6-1	AB-743	A47-1.5Meg-S	Q11-138	U18S	Brightness
B	Shaft		Not Req.	AK-4	KBS-3	Not Req.	Not Req.	Attach to R6A
R7A	1Meg	½	PT-3S65-1	BX-89	A47-1Meg-S	Q11-137	TA16L	Height
B	Shaft		Not Req.	Not Req.	FSG-1/4	Not Req.	Not Req.	Attach to R7A
R8	400Ω	3	PT-4S3		30-500		FL-60	Horz Wire-Wound
R9	10K	2	PT-4S39			B11-118, TM-1	TA14L	Width
						B11-127, S.N		

Note #1. Some models may use an alternate control Part No. PT-3S19-1 in this application, the replacement for this control is the same as #1.
* Concentrikit equivalent: K-3 kit, base elements & shafts; R1-109 & P1-109 (Panel)
B13-127 & R1-126 (Rear)
78-1 (Switch).
† Universal replacement (Mallory exact duplicate Part No. UE-196-S).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R10	680K			BTS-680K	
R11	47K			BTS-47K	
R12	820K			BTS-820K	
R13	560K			BTS-560K	
R14	10K			BTS-10K	
R15	330K			BTS-330K	
R16	10K				
R17	10K				
R18	15K			BTS-15K	
R19	1Meg			BTS-1Meg	
R20	470K			BTS-470K	
R21	1000Ω			BTS-1000	
R23	5600Ω				
R23	330Ω			BTS-330	
R24	47Ω			BTS-47	
R25	330Ω			BTS-330	
R26	15K			BTS-15K	
R27	330Ω			BTS-330	
R28	47Ω			BTS-47	
R29	330Ω			BTS-330	
R30	180Ω			BTS-180	
R31	5600Ω			BTS-5600	
R32	1. 5Meg			BTS-1. 5Meg	
R33	1Meg			BTS-1Meg	
R34	1500Ω	2	PT-4S39-2	BTS-1500	Note 1
R35	10K	2		BTB-10K	
R36	33K	2		BTB-33K	Note 2
R37	150Ω			BTS-1500	
R38	180K			BTS-150	
R39	22K			BTS-180K	
R40	2700Ω			BTS-2700	
R41	100K			BTS-100K	
R42	3900Ω			BTS-3900	
R43	1000Ω			BTS-1000	
R44	47K			BTS-47K	
R45	1000Ω			BTS-1000	
R46	330K			BTS-330K	
R47	4700Ω	1		BTA-4700	
R48	150Ω			BTS-150	
R49	1Meg	5%		BTS-1Meg 5%	Note 3
R50	1Meg			BTS-1Meg	
R51	700Ω	10	RE3959	BTS-700	
R52	22K			BTS-22K	
R53	10Meg			BTS-10Meg	
R54	10Meg			BTS-10Meg	
R55	470K			BTS-470K	
R56	2. 2Meg			BTS-2. 2Meg	
R57	22K			BTS-22K	
R58	1000Ω			BTS-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R59	220K			BTS-220K	
R60	330K			BTS-330K	
R61	47K			BTS-47K	
R62	33K			BTS-33K	
R63	1Meg			BTS-1Meg	
R64	2700Ω			BTS-2700	
R65	10K			BTS-10K	
R66	82K			BTS-82K	
R67	82K			BTS-82K	
R68	1Meg			BTS-1Meg	
R69	180K			BTS-180K	
R70	33K			BTS-33K	
R71	22K			BTS-22K	
R72	82K			BTS-82K	
R73	2. 2Meg			BTS-2. 2Meg	
R74	1. 5Meg			BTS-1. 5Meg	
R75	1Meg			BTS-1Meg	Note 4
R76	5600Ω			BTS-5600	
R77	560Ω			BTS-560	
R78	560Ω				
R79	560Ω				
R80	330K				
R81	330K	1			
R82	330K	5% 1			
R83	82K	5% 1			
R84	3900Ω				
R85	82K				Note 10
R86	68K				Note 10
R87	150K			BTS-150K	Note 8
R88	150K	5% 1			
R89	8300Ω				
R90	100K				
R91	100K				Note 7
R92	150K	1			Note 8
R93	22K	1			
R94	2. 2Meg			BTS-2. 2Meg	
R95	47K			BTS-47K	
R96	470K	2		BTS-470K	
R97	8200Ω	2			Note 11
R98	33K	1			
R99	33Ω	1			
R100	100K				
R101	330K				
R102	47K				
R103	1000Ω				
R104	3. 3Ω		RE4R9	BWH-3. 3	
R105	200Ω	20	RE3949	2D-200	Note 9
R106	100K	1		BTA-100K	

Note #1. In chassis CG and CH a 10K 2W resistor is used in this application.
Note #2. In chassis CG and CH a 47K 2W resistor is used in this application.
Note #3. In chassis CG and CH an 820K 1W resistor is used in this application.
Note #4. Some versions use a 1. 5Meg resistor in this application.
Note #5. In chassis CG and CH a 47K 1W resistor is used in this application.
Note #6. In chassis CG and CH a 330K resistor is used in this application.
Note #7. In chassis CG and CH a 150K resistor is used in this application.
Note #8. In chassis CG and CH a 100K 1W resistor is used in this application.
Note #9. Not used in chassis CG and Ch.
Note #10. Not used in some versions.
Note #11. In chassis CG and CH a 12K 2W resistor is used in this application.

TRANSFORMER (POWER)

ITEM No	RATING			REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	OLYMPIC PART No.	Hallderson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1. 45A	580VCT @ 220A	5V @ 3A	6. 3V @ 8A	TR3621-1	P-9735	P-2836 ①	P-8164	

① Tape 6. 3V, 1. 2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA						
		OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	TR3599-2	F84H[*]1	HVO-2[*]1	225T7[*]1	X080[*]1	A-8262[*]1	F,FLY-14[*]1
T3	Vert. Output Trans.	Z1803	Z1803	Z047 ②	219D1 ②	A-8122	Z8851	D-1P[*]① A-11X
T4A	Yoke(90°)Horiz(15.8MHz)	CL3600	DF607 ②	MDF-93		YH3F18/43	SYF-18A	Y-16 ②	Y-41-1
B	Vert(413Hz)					②			

① Drill new mounting hole(s)
② Connect horiz. yoke damping network across terms 43 and 47. Use original if necessary.
‡ This part may be superceded by Parts Manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
9	9	9	9	9	9	9	9
8	8	8	8	8	8	8	8
6	6	6	7	7	7	7	7
2 & 3	3	3	3	3	3	3	3
1	1	1	1	1	1	1	1

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T5	2. 4K	3-4Ω	TR3766-1	Z1101	A-3026	A-3323	Z8856 ①	S-12X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5"	PM	3-4Ω	8K1788-3 ①	5A07	209B3	① Used in models ITC12 and ITD13.
	5"	PM	3-4Ω	8K3147-1 ②	5A15T		② Used in models 14C42, 14C43, 4KG44 & 4KG45.
	9"	PM	3-4Ω	8K3068-2 ③	8A3U	234B1	③ Used in models 12C23, 14C42, 14C24, 14C28, 4CG27, 4KG45, 4CH28 & 4CH24.
	8"	PM	3-4Ω	8K3148-1 ④	8A3U	209B2	④ Used in models 14C42, 14C43 & 4KC44.
	8"	PM		8K3381 ⑤			⑤ Used in models 14C42 & 4CC26.
	4"	PM	3-4Ω	8K4343 ⑥	4A07	223B1	⑥ Used in models 12C23 & 4CG26.
							Used in models 12C23, 12D24, 14C28, 4CG27, 4CH28 & 4CH29.

COILS (RF-IF)

ITEM No.	USE	OLYMPIC PART No.	NOTES
L1A	Ant., RF, Mixer Grid, Osc. Coils	TCB-2	Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	TCB-3	Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	TCB-4	Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	TCB-5	Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	TCB-6	Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	TCB-7	Channel 7

ITEM No.	USE	OLYMPIC PART No.	NOTES
L1G	Ant., RF, Mixer Grid, Osc. Coils	TCB-8	Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	TCB-9	Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	TCB-10	Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	TCB-11	Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	TCB-13	Channel 13
L	Ant., RF, Mixer Grid, Osc. Coils	TCB-13	Channel 13

ITEM No.	USE	REPLACEMENT DATA				NOTES
		OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L2	1st Video IF					
L3	RF Choke	CL1526	19-3038	TV-180	6178	39 Microhenry
L4	2nd Video IF	CL4413	17-1063	TV-126	6319	
L5	21. 75MC Trap	CL2973	20-1021	TV-128*	6171*	
L6	3rd Video IF	CL4423	17-1064	TV-116	6329	
L7	21. 75MC Trap	CL2973	20-1006		6171A	
L8	4th Video IF	CL4413	17-1064	TV-116	6319	
L9	Series Peaking Coil	CE4047			4653	6. 8 Microhenry; IRC Part #CL-1 Note #1.
L10	Series Peaking Coil	CL3401	19-3075▲	TV-181▲	6172▲	80 Microhenry Wound on 1Meg Resistor
L11	Shunt Peaking Coil	CL3403	19-3300▲	TV-190▲	6188▲	300 Microhenry; Wound on 1Meg Resistor
L12A	4. 5MC Trap	TR3356-1				
B	Sound IF					
L13	Series Peaking Coil	CL3398	19-3290▲	TV-185▲	6181▲	220 Microhenry; Wound on 15K Resistor
L14	Shunt Peaking Coil	CL3403	19-3300▲	TV-190▲	6188▲	300 Microhenry; Wound on 1Meg Resistor
L15	RF Choke	CL3401	19-3075▲	TV-181▲	6172▲	80 Microhenry; Wound on 22K Resistor
L16	Quadrature Coil	CL3803-1				

*Enlarge mtg. hole.
■ Parallel with 1Meg resistor.
▲ Parallel with 22K resistor.
● Parallel with 15K resistor.
Note #1. Some versions may use a 56 microhenry coil in this application.

OLYMPIC MODELS 14CC33, 14CC34, 14CD24, 14CD25, 14CK41, 14CK42, 14CK43, 17CT12, 17D13, 4CC26, 4CG27, 4CG28, 4CH28, 4CH29, 4KG44, 4KG45 (Ch. CC, CD, CG, CH).

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L17	22Ω	53Ω	TR2294	20-1402*	TV-162*	6183*	205R1*	H-100*	HS-3*	Waveform winding = 46Ω

* Reverse coil mounting in can.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	OLYMPIC PART No.	REPLACEMENT DATA	
K1	Vertical Integrator	22K, 8200Ω, 8200Ω, 2000MMF, 5000MMF, 5000MMF	PC2435	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA110 PC-100 115TM1 1405-01 V-1

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			OLYMPIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	C	3/8A 250V	FU4345	FH4344	332.375 (C-3/8A)	346002	C 3/8	HC 3/10 to ½

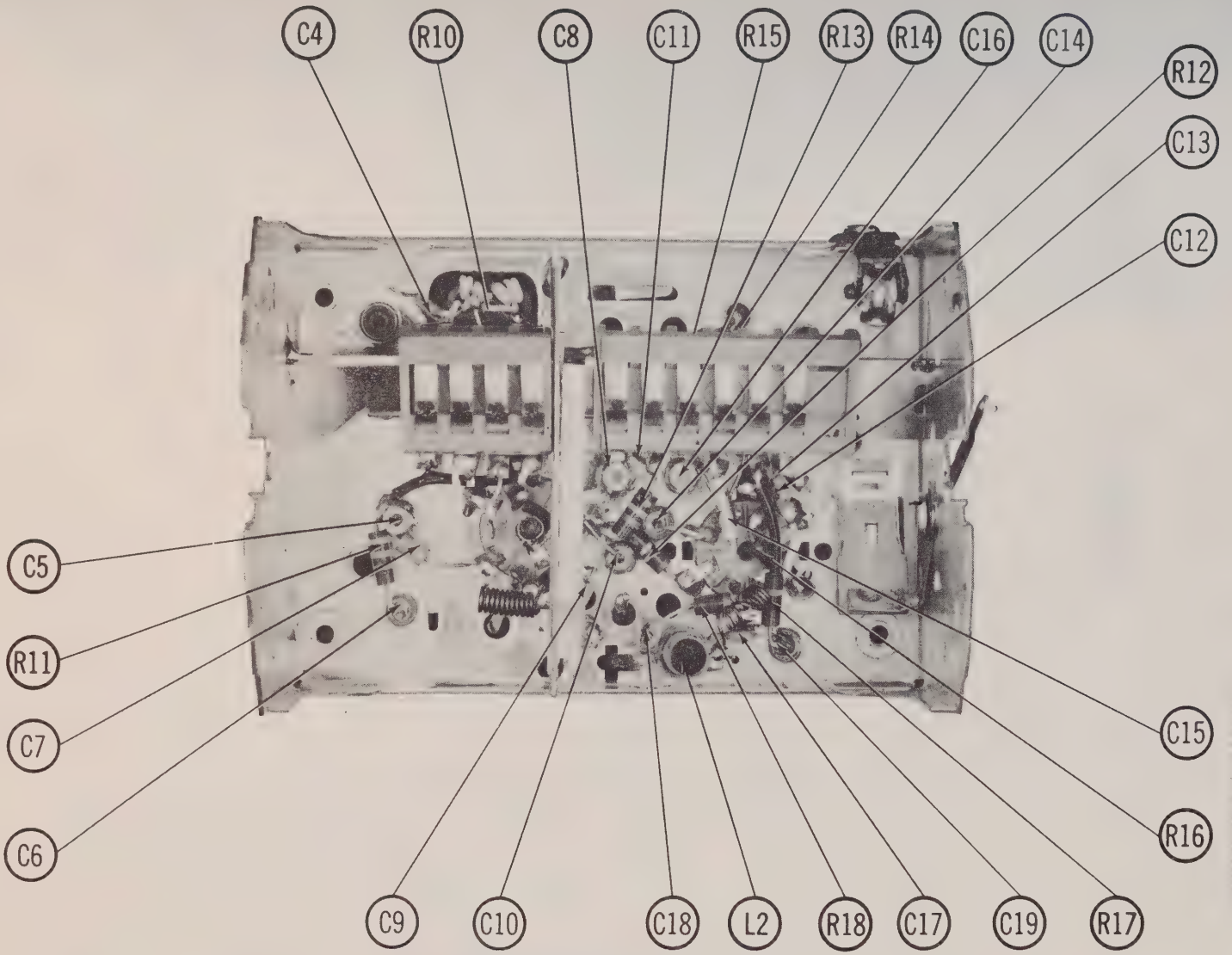
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		OLYMPIC PART No.	SYLVANIA PART No.	
M2	1N64*	1N64	1N60	Video Det. (Pigtail)

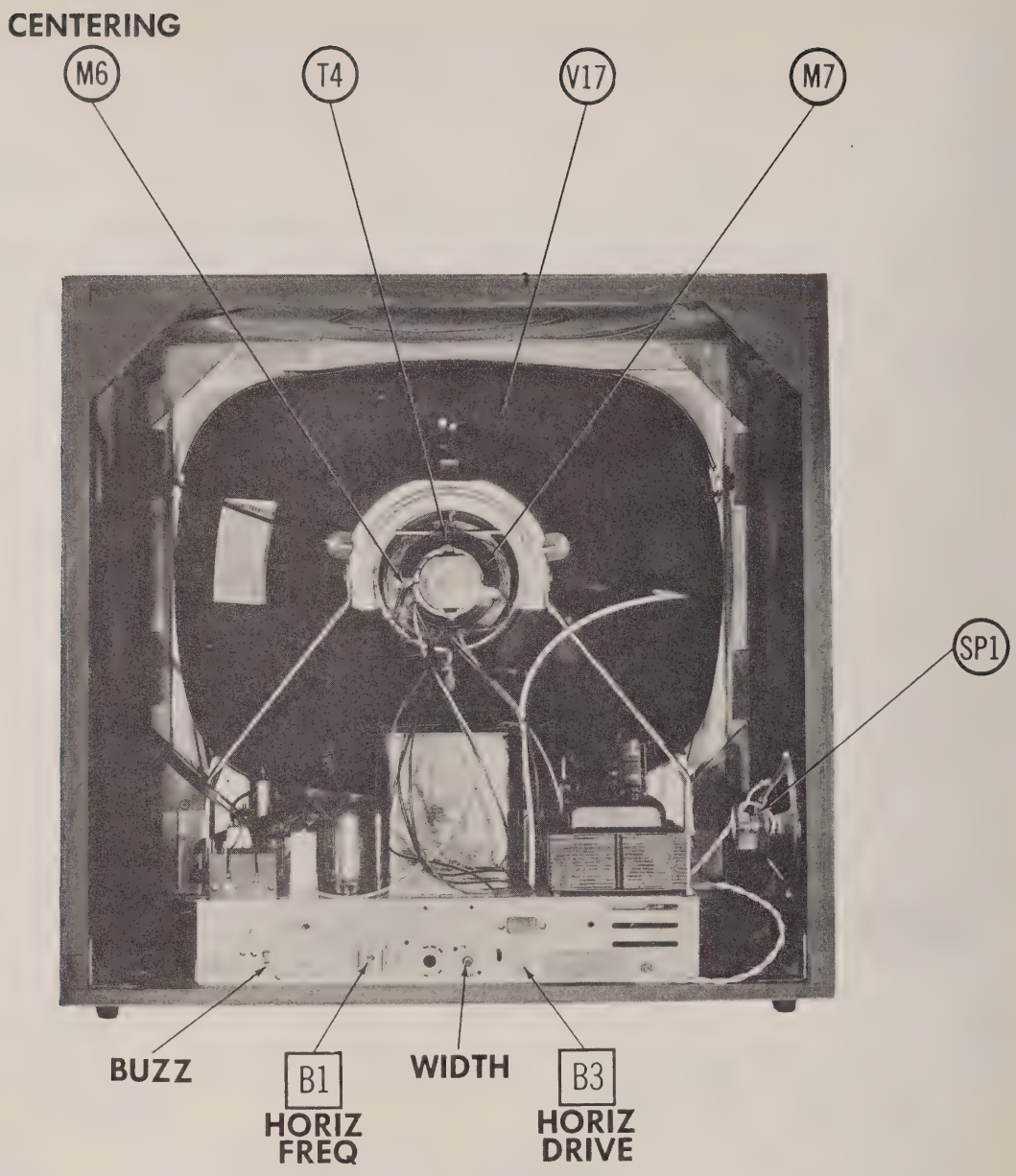
* Some versions may use crystal diode type 1N60 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Dial Light	BU187	#47
M4	Tuner	CL4326	VHF
M5	Focus Magnet	PP4418	Includes Centering Device. Chassis CG & CH.
M6	Centering Device	PP2763	Chassis CC & CD.
M7	Ion Trap	PP2248	
B3	Trimmer Cap.	CT3526	Horiz. Drive (110-580MMF)
	Cabinet	CA4154	Model 1KC42
	Cabinet	CA4158	Model 4KG44
	Cabinet	CA4165	Model 1KC41
	Cabinet	CA4170	Model 4KG45
	Cabinet	CA4185	Model 1KC43
	Cabinet	CA4312	Model 4CG27
	Cabinet	CA4313	Model 1TD13
	Cabinet	CA4314	Model 1CD24
	Cabinet	CA4315	Model 1CD25
	Cabinet	CA4316	Model 1TC12
	Cabinet	CA4317	Model 1CC23
	Cabinet	CA4317-1	Model 1CC22
	Cabinet	CA4321	Model 4CH28
	Cabinet	CA4330	Model 4CH29
	Cabinet	CA4364	Model 4CG26
	Knob	KN2295-2	Channel Selector (Gold) - Model 1KC42 only.
	Knob	KN3900-2	Channel Selector (Mahogany) - Chassis CC & CG.
	Knob	KN3900-1	Channel Selector (Tan) - Chassis CC & CG.
	Knob	KN4402	Channel Selector (Mahogany) - Chassis CD & CH.
	Knob	KN4402-1	Channel Selector (Tan) - Chassis CD & CH.
	Knob	KN2297-2	On-Off-Volume (Gold) - Model 1KC42 only.
	Knob	KN3901-2	On-Off-Volume (Mahogany) - Chassis CC & CG.
	Knob	KN3901-1	On-Off-Volume (Tan) - Chassis CC & CG.
	Knob	KN4404	On-Off-Volume (Mahogany) - Chassis CD & CH.
	Knob	KN4404-1	On-Off-Volume (Tan) - Chassis CD & CH.
	Knob	KN2296-1	Fine Tuning (Gold) - Model 1KC42.
	Knob	KN3902	Fine Tuning - Chassis CC & CG.
	Knob	KN4403	Fine Tuning - Chassis CD & CH.
	Knob	KN2298-1	Contrast (Gold) - Model 1KC42.
	Knob	KN3903	Contrast -Chassis CC & CG.
	Knob	KN4405	Contrast (Mahogany) - Chassis CD & CH.
	Knob	KN4405-1	Contrast (Tan) - Chassis CD & CH.
	Knob	KN4052	Control (3 Used) - Chassis CC & CG.
	Knob	KN4052-2	Control (3 Used) - Chassis CD & CH.
	Knob	KN4409	Range (Mahogany) - Chassis CD & CH.
	Knob	KN4409-1	Range (Tan) - Chassis CD & CH.
	Mask	PP3646-2	Chassis CC & CD
	Mask	PP3938	Chassis CG & CH.
	Safety Glass	PP3656-1	Chassis CC & CD.
	Safety Glass	PP3939-1	Chassis CG & CH.



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Connect a short jumper across terminals "C" and "D" of the horizontal oscillator transformer (L17).

Set the horizontal hold control fully clockwise. Adjust the horizontal frequency slug (B1) until the picture falls in sync. Remove the jumper from L17. Connect the high side of the vertical amplifier of scope thru 5MMF to terminal "C" of L17. Low side to chassis. Adjust the horizontal waveform slug (B2) for a waveform similar to Fig. 5 with the broad and narrow peaks of equal amplitude . If necessary during adjustment of B2, keep the picture in sync with horizontal hold control or B1. Remove the scope and retouch B1 for the following conditions.

1. At full clockwise position of the horizontal hold control, a blanking bar or picture jitter should be evident.

2. At full counter clockwise position of the horizontal hold control, the picture should lose sync with 4½ to 5 diagonal bars sloping downward to the left. If the picture remains in sync at either extreme setting of the horizontal hold control, switch off channel and back again so that the picture falls out of sync.

Adjust the horizontal drive trimmer (B3) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture. If neither of these indications appear, adjust B3 for a picture slightly wider than necessary to fill the picture mask horizontally.

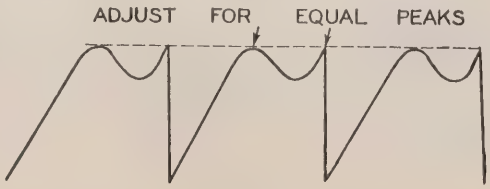
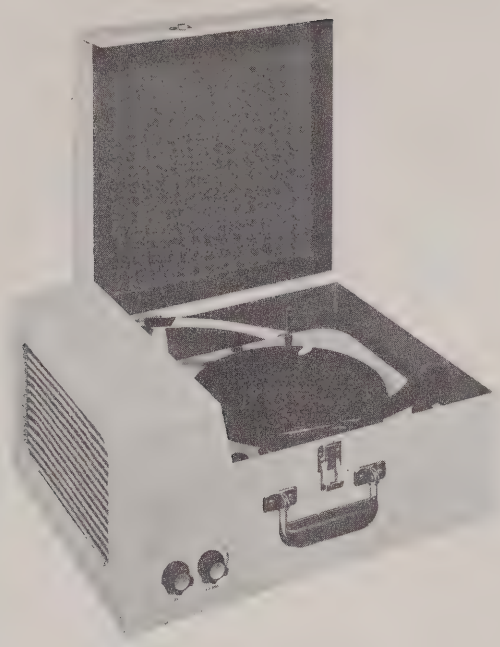


FIG. 5

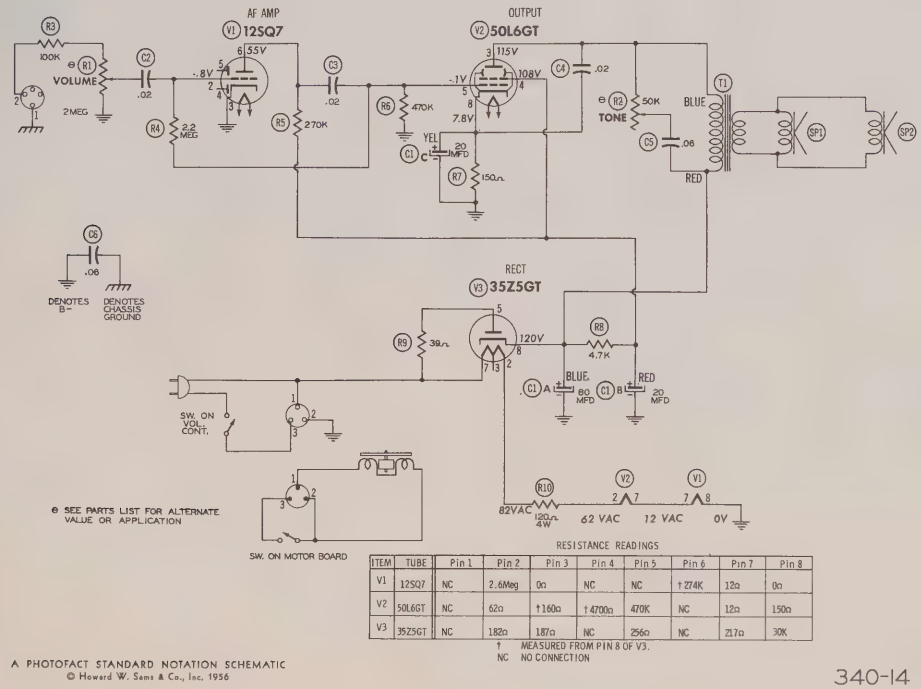
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



PHONOLA
MODEL 755

TRADE NAME	Phonola Model 755
MANUFACTURER	Waters Conley Co., Inc., Rochester, Minn.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12SQ7 AF Amp., 50L6GT Output, 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC - 60 Cycles RATING .24 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET #216 - FOLDER #11 OR RECORD CHANGER MANUAL CM-5.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	12SQ7	NC	2.6Meg	0Ω	NC	NC	†274K	12Ω	0Ω
V2	50L6GT	NC	62Ω	†160Ω	†4700Ω	470K	NC	12Ω	150Ω
V3	35Z5GT	NC	182Ω	187Ω	NC	256Ω	NC	217Ω	30K

† MEASURED FROM PIN 8 OF V3.
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12SQ7	
V2	Output	50L6GT	

ITEM No.	USE	TYPE	NOTES
V3	Rectifier	35Z5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	PHONOLA PART. No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150	10427				TML-1	FMT-333	
B	20	150							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PHONOLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.02	200		BPD-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C3	.02	200		BPD-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C4	.02	200		BPD-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C5	.06	200		P288N-06		CUB6S6		PT616	6TM-S6	
C6	.06	200		P288N-06		CUB6S6		PT616	6TM-S6	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHONOLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	11512	AB-76	A47-2Meg-Z	Q13-139	U-55	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A
R1A	2Meg	½	10496	AB-76	A47-2Meg-Z	Q13-139	U-55	Volume (Note 1)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A
R2A	50K	½	11507	AB-32	A47-50K-Z	Q13-123	U-33	Tone
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A
R2A	50K	½	10510	AB-32	A47-500K-Z	Q13-123	U-33	Tone (Note 1)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A

Note 1: Used as an alternate in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PHONOLA PART No.	IRC PART No.	
R3	100K			BTS-100K	
R4	2.2Meg		10302	BTS-2.2Meg	
R5	270K		8841	BTS-270K	
R6	470K		10305	BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PHONOLA PART No.	IRC PART No.	
R7	150Ω		9897	BTS-150	
R8	4700Ω		10429	BTS-4700	
R9	39Ω		10428	BTS-39	
R10	120Ω	4	10306		

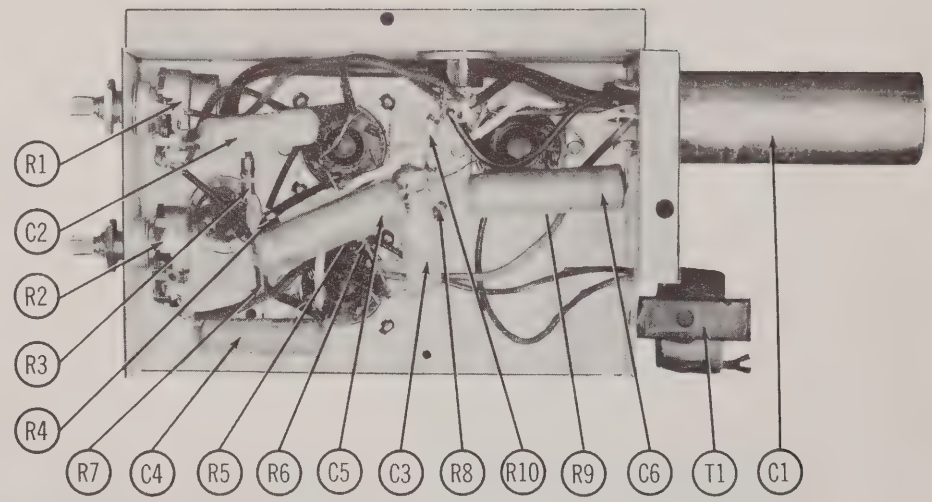
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PHONOLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2100Ω	1.75Ω	11876	Z1001		24S51			

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	PHONOLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.5Ω	11792	4A07	223S1	
SP2	4"	PM	3.5Ω	11792	4A07	223S1	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	PHONOLA PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		40-T	A-1 and A-3	46-T	0-1 or S-1 and 0-3	

ASTATIC AND ELECTRO VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	PHONOLA PART No.	JENSEN PART No.	WALCO PART No.		
M2		*W-16 or †W-14 or ♦W-14D and *W-17 or †W-15 or ♦W-15D	*W-11A or †W-10S or ♦W-10D and *W-11MGA or †W-10MGS or ♦W-10MGD		* Metal † Jewel ♦ Diamond

RCA VICTOR MODELS 6-C-5A, B, C, 7-C-6F, N (Ch. RC-1157A)

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RCA VICTOR MODELS 6-C-5A, B, C, 7-C-6F, N (Ch. RC-1157A)

RCA VICTOR MODELS 6-C-5A, B, C, 7-C-6F, N (Ch. RC-1157A)

TRADE NAME	RCA Victor Models 6-C-5A, 6-C-5B, 6-C-5C, 7-C-6F, 7-C-6N (Ch. RS-1157A)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 8, N. J.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 12BA6 (V2). Low side to B-.	455KC (400~ mod.)	Tuning gang fully open.	Across voice coil.	A1	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to antenna lug on tuning gang. Low side to B-.	"	"	"	A2, A3	"
3.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1400KC	Tune to 1400KC signal.	"	A5	"
5.		"	600KC	Tune to 600KC signal.	"	A6	Adjust for maximum output while rocking tuning gang.

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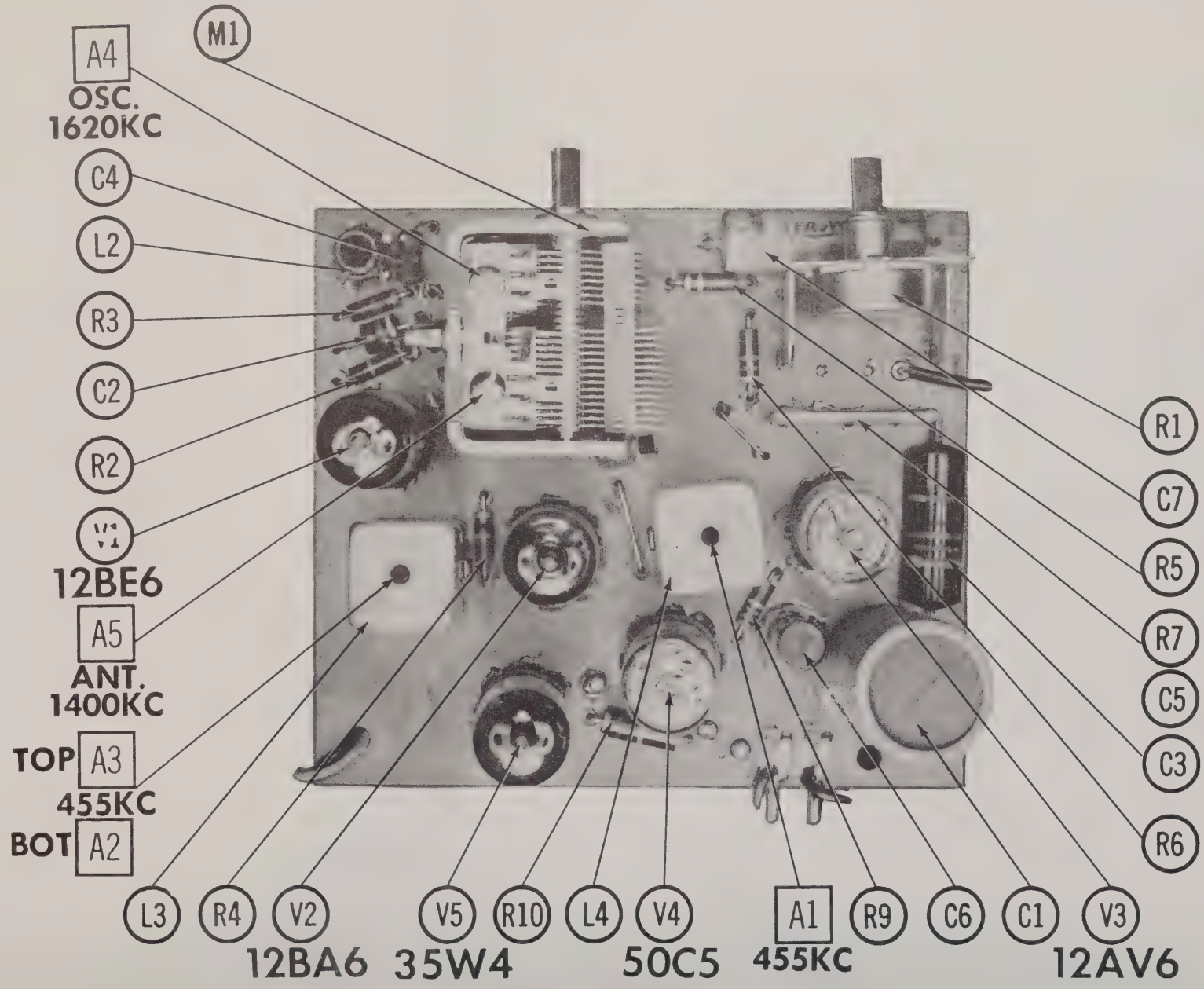


CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amplifier	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA VICTOR PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150	101426	PRS150V8040				FMD-303	R2275*
B	50	150							

* Non-Catalog Item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA VICTOR PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	400	73553	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C3	56		100085	NPO-SI56	TCZ-56	TZ24	NPO-337-560			
C4	4.7		77471							
C5A	220									
B	5000									
C	5000		† 101065	† PA-512	† PC-158				† DT-5	
D	250									
E										
C6	.015	400	101073	BPD-015	DD16-153				4SE-S15	
C7	.047	400	73553	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

† Items C5A, C5B, C5C, C5D, C5E, R7A, R7B, and R7C are combined in one unit. When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA VICTOR PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	101342					Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA VICTOR PART No.	IRC PART No.	
R2	22K		502322	BTS-22K	
R3	100Ω		502110	BTS-100	
R4	100Ω		502110	BTS-100	
R5	3.3Meg		502533	BTS-3.3Meg	
R6	47K		502347	BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA VICTOR PART No.	IRC PART No.	
R7A	6.8Meg		† 101065	BTS-6.8Meg	
B	470K			BTS-470K	
C	470K			BTS-470K	
R8	4700Ω		502247	BTS-4700	Note #1
R9	180Ω		502118	BTS-180	
R10	1200Ω	1	512212	BTA-1200	

† Items R7A, R7B, R7C, C5A, C5B, C5C, C5D, C5E are combined in one unit.
Note #1 Not used in some versions.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA VICTOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	79283	Z1102 ①	A-3031 ①	A-3336 ①	24S50A ①	S-16X ①	① Drill one new mounting hole,

SPEAKER

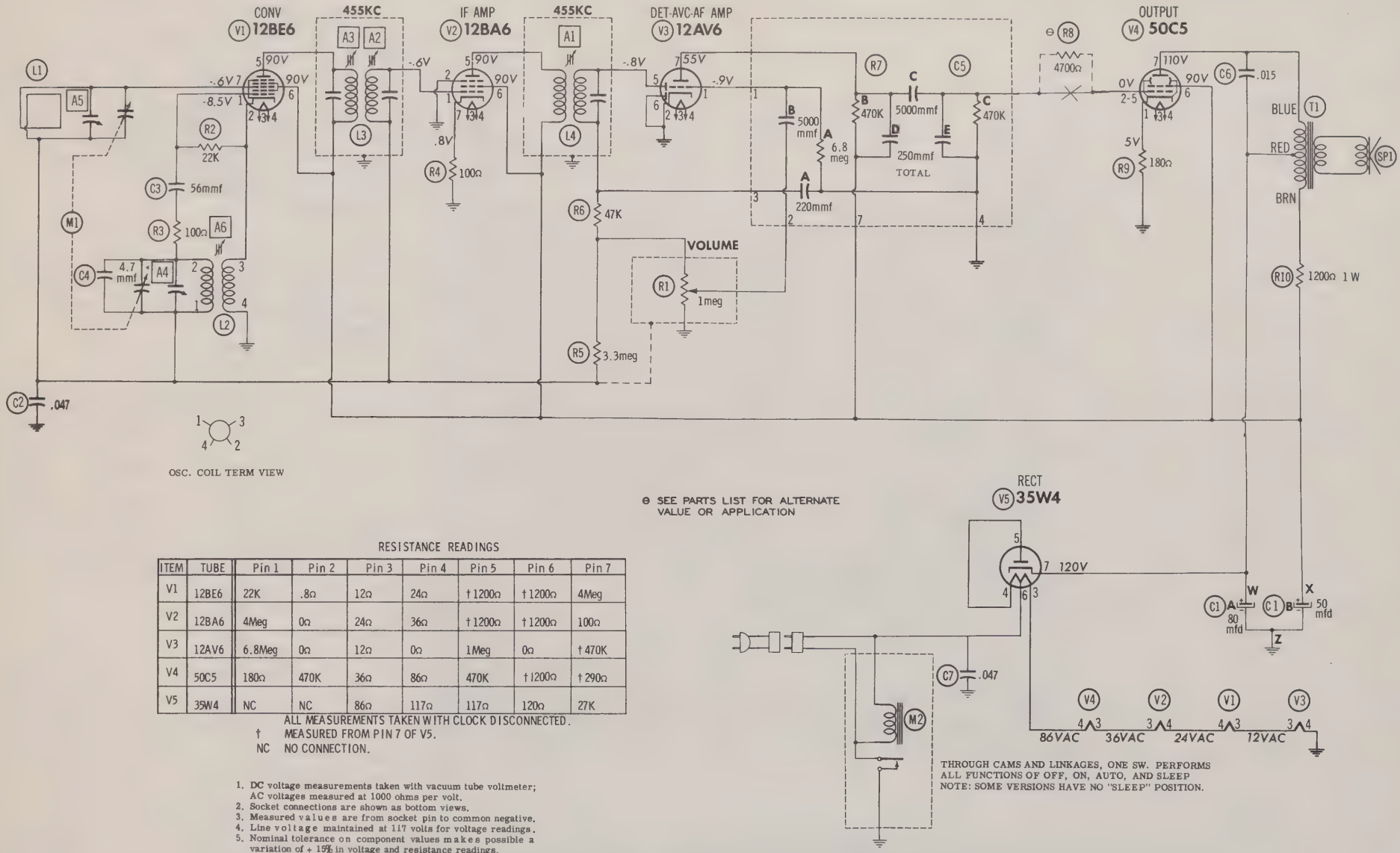
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA VICTOR PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4 Ω	79696	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA VICTOR PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.2Ω		101573				
L2	Osc. Coil	.8Ω	8.3Ω	101072				
L3	Input IF	13Ω	13Ω	101067	16-6780		13-PC1	
L4	Output IF	26Ω	13Ω	101066				

MISCELLANEOUS

ITEM No.	PART NAME	RCA VICTOR PART No.	NOTES
M1	Tuning Cap	101343	2 Gang
M2	Clock		
	Cabinet	Y2873	Model 7C6F
	Cabinet	Y2874	Model 7C6N
	Cabinet	Y2854	Model 6C5A
	Cabinet	Y2856	Model 6C5C
	Cabinet	Y2855	Model 6C5B
	Knob	101576	Volume, Model 7C6F
	Knob	101577	Volume, Model 7C6N
	Knob	101331	Volume, Model 6C5A
	Knob	101333	Volume, Model 6C5C
	Knob	101332	Volume, Model 6C5B
	Knob	101578	Tuning, Model 7C6F
	Knob	101579	Tuning, Model 7C6N
	Knob	101334	Tuning, Model 6C5A
	Knob	101336	Tuning, Model 6C5C
	Knob	101335	Tuning, Model 6C5B
	Knob	101580	Clock (2Used) Model 7C6F
	Knob	101581	Clock (2 Used) Model 7C6N
	Knob	101337	Clock Model 6C5A
	Knob	101339	Clock Model 6C5C
	Knob	101338	Clock Model 6C5B
	Window	101575	Clock, Models 7C6N, 7C6F
	Window	101330	Clock, Model 6C5A, 6C5C, 6C5B



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.8Ω	12Ω	24Ω	†1200Ω	†1200Ω	4Meg
V2	12BA6	4Meg	0Ω	24Ω	36Ω	†1200Ω	†1200Ω	100Ω
V3	12AV6	6.8Meg	0Ω	12Ω	0Ω	1Meg	0Ω	†470K
V4	50C5	180Ω	470K	36Ω	86Ω	470K	†1200Ω	†290Ω
V5	35W4	NC	NC	86Ω	117Ω	117Ω	120Ω	27K

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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RETMA MEMBER
RADIO-ELECTRONICS-TELEVISION MANUFACTURERS ASSOCIATION

3924 MEADE ST.
DENVER, COLORADO

RCA VICTOR
MODELS 7-TR-2, 7-TR-3

RCA VICTOR
MODELS 7-TR-2, 7-TR-3

GENERAL INFORMATION

The RCA Models 7-TR-2 and 7-TR-3 Tape Recorders features fingertip operation for Fast Forward, Playback, Stop, Record and Fast Reverse. This recorder is designed to record and playback two tracks of material on standard width recording tape, which doubles the playing of a reel with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speakers or an external speaker may be used through use of the Auxiliary Speaker Jack on Model 7-TR-3.

A window-type tape counter is used on Model 7-TR-3 whereas Model 7-TR-2 has a numbered scale on the metal base to help locate desired selections on the tape.

Models 7-TR-2 and 7-TR-3 have two tape speeds, 7 1/2 ips and 3 3/4 ips. Using both tracks, the recording time is as follows:

Reel Size	3 3/4" Speed	7 1/2" Speed
5" (600 ft.)	1 hour	1/2 hour
7" (1200 ft.)	2 hours	1 hour

CAUTION: Severe damage will result if connection is made to a direct current (DC) line.

Manufactured by:

Radio Corporation Of America
RCA Victory Radio And "Victrola" Division
Camden, New Jersey

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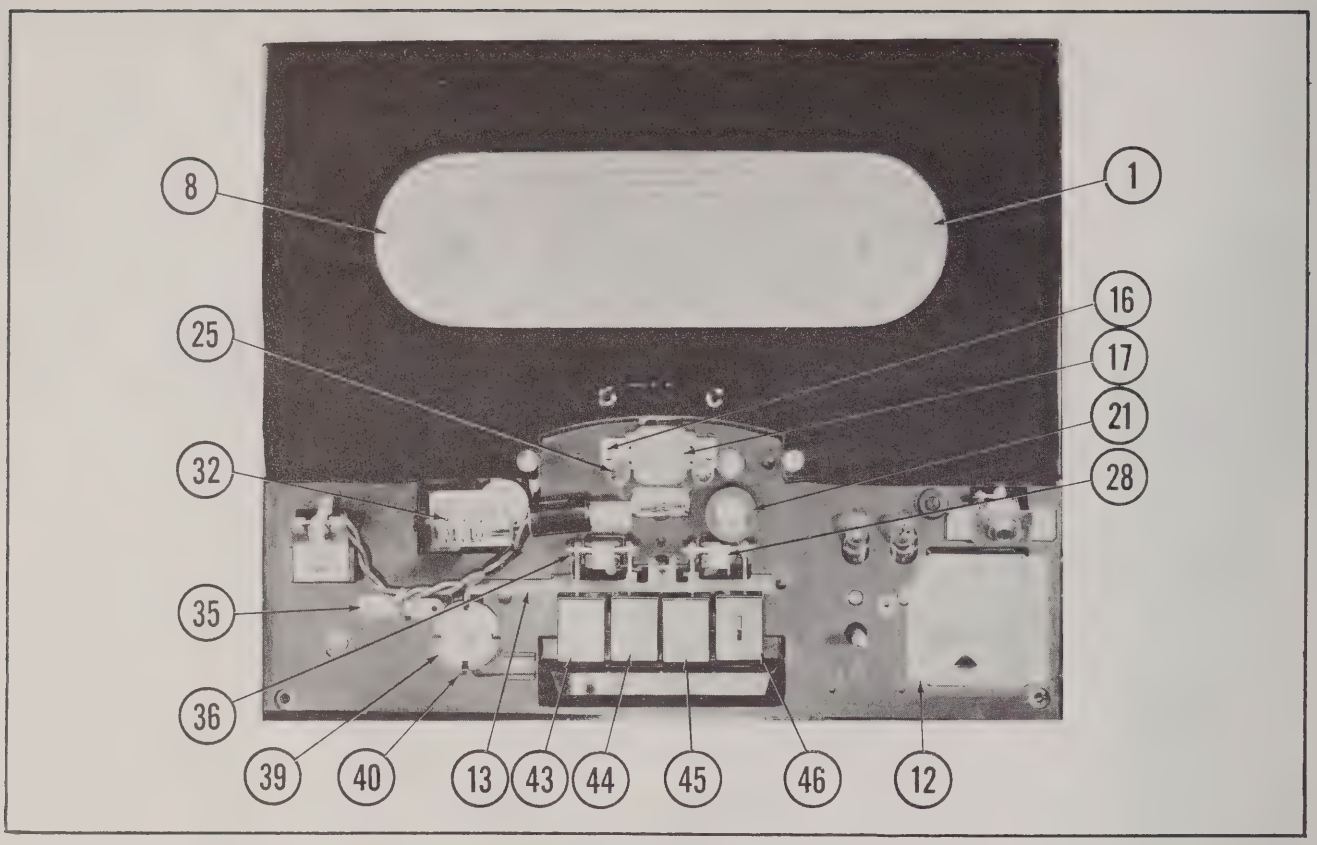


FIGURE 1

SPECIFICATIONS

Rewind Time: 7" Reel (1200 ft.) in less than 2 1/3 min.

Tape Speed: 3.75 ips or 7 1/2 ips.

Inputs: High impedance with preamplifier for microphone. High impedance for record player or radio tuner. Low impedance source can be used.

Tube Complement:

1. 5879: Oscillator & Tape Preamp.
2. 12AX7: Two Stage A. F. Amplifier.
3. 6AQ5: Output
4. 6X4: Rectifier

Chassis Designations:

Model	Amplifier Chassis	Tape Transport
7-TR-2	RS-156B	TR-2-2
7-TR-3	RS-156	TR-2-1

Power Supply Rating: 115 volts, 60 cycle, 100 watts.

Power Output: 2.5 watts undistorted.

Speakers:

One 5" x 7" PM (Model 7-TR-2, 3.2 ohm).
One 6 1/2" PM (Model 7-TR-3) 3.2 ohm).
Two 3 1/2" PM (Model 7-TR-3) 7 ohm

Cabinet Dimensions: Height 9-5/16", Width 18-1/16", Depth 14-9/16".

Weight: Model 7-TR-2 — 33 1/4 lbs. Model 7-TR-3 — 38 lbs.

OPERATING INSTRUCTIONS

1. Plug the AC cord into a convenient wall receptacle of the proper rating.

2. Turning the Power-Speed control (9) turns the recorder "ON" and at the same time selects the speed at which it is desired to record or play.

Threading The Tape-

With the "Stop Bar" (47) depressed, place an empty reel on the right hand (take-up) spindle (1). Place a full reel of tape on the left hand supply spindle (8) so that the reel will turn counterclockwise when tape is pulled from the reel. Make certain that the reel protrusions on the spindles engage the slots in the hub of the reels and that the reels are fully seated. Reel out about two feet of tape and feed the loose end up into the empty reel on the right spindle. Thread the tape into one of the slots in the outer surface of the hub. Hold the loose end between the fingers and slowly rotate this reel counterclockwise through a couple of revolutions. While taking up slack in the tape between the two reels the tape will automatically drop into the tape slot.

To Record From Microphone-

1. Insert the microphone plug into the "Mic" input jack.

2. Turn the Power-Speed control "ON" and allow approximately 30 seconds for the unit to warm up.

3. Unlock and push the "Record" button. Observe the "Record Level" indicator lamps while speaker into the microphone. Occasional flickering of the

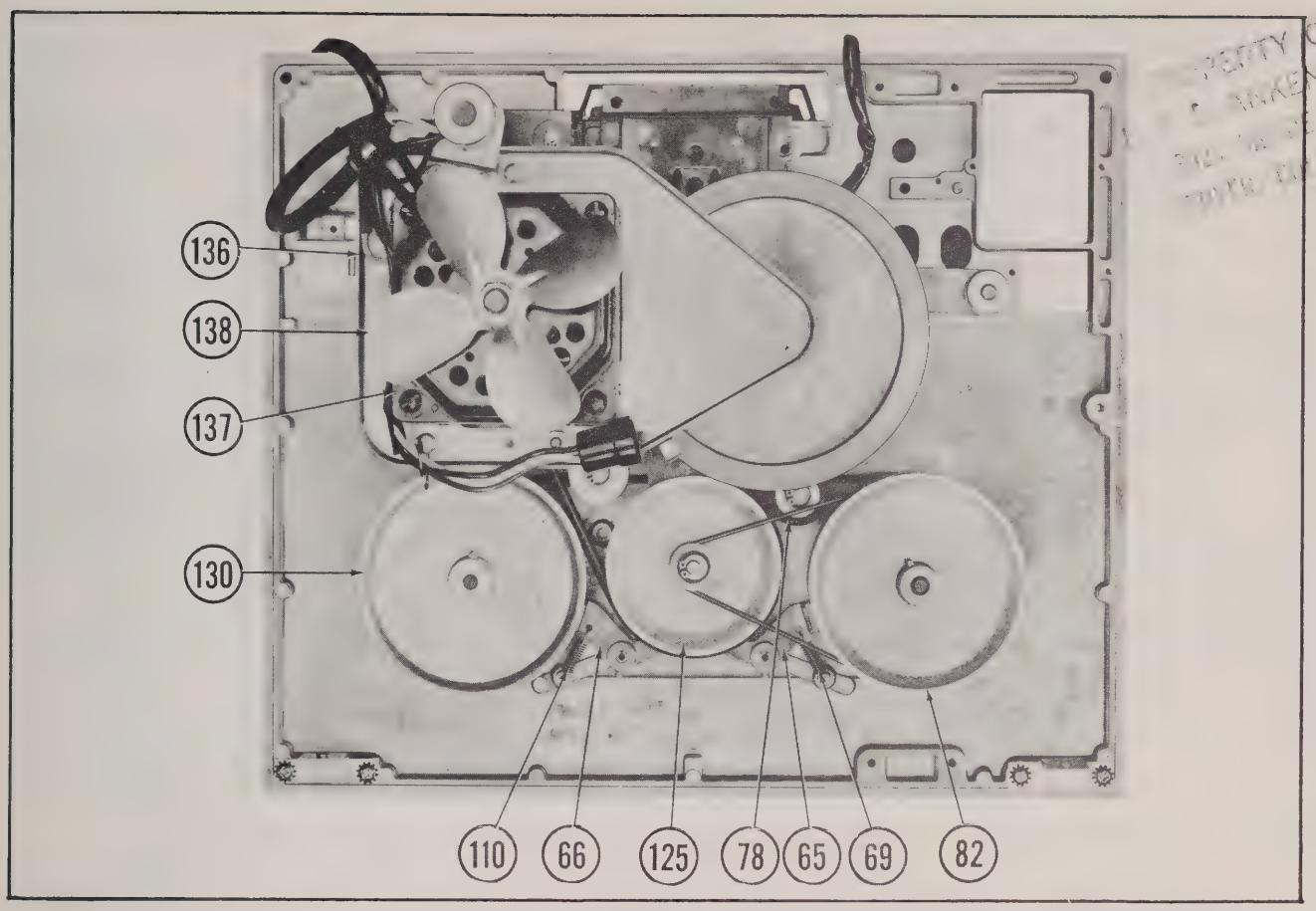


FIGURE 2

"Overload" lamp indicates a good, high level of recording, however, continuous glowing or flashing in this lamp indicates that the "Volume" control setting must be reduced. Be sure that the "Normal" lamp glows fairly full and steady or you may not be recording properly, if at all.

NOTE: The "Tone" control is inoperative when recording.

To Record From Radio, TV, Or Phonograph-

1. Take the radio-phono attachment cord from the storage compartment.

2. Turn off power to the recorder.

3. With the two alligator clips on the end of the radio-phono attachment cord, connect across the amplifier output or voice coil on the speaker of the radio, phono, or TV set.

4. Insert the plug of the radio-phono cord into the Radio-Phono input jack on the front panel of the recorder.

5. Proceed with the recording as described in "To Record From Microphone".

To Play A Recording-

1. Thread the tape as described under "Threading The Tape".

2. Turn the Power-Speed control "ON" and allow about 30 seconds for warm up.

3. Depress the "Play" button until it is latched into position.

4. Adjust the "Volume" and "Tone" controls for desired level.

Double-Track Recording-

The RCA is designed so that only 1/2 the tape width is recorded at a time, thereby resulting in double-track recording. This double track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all the tape wound onto the take-up reel, depress the "Stop Bar". This stops all movement of the tape.

2. Remove the reels from the recorder, turning the full reel over and placing it on the left spindle and the empty reel on the right spindle.

3. Properly thread the tape and proceed with the recording.

4. After the second track has been recorded the first track is ready to be played, without rewinding, as follows:

(a) Place the full reel of tape on the left spindle and the empty reel on the right spindle.

(b) Thread the tape making sure the dull side faces the play-record head.

(c) Set the controls as described under "To Play A Recording".

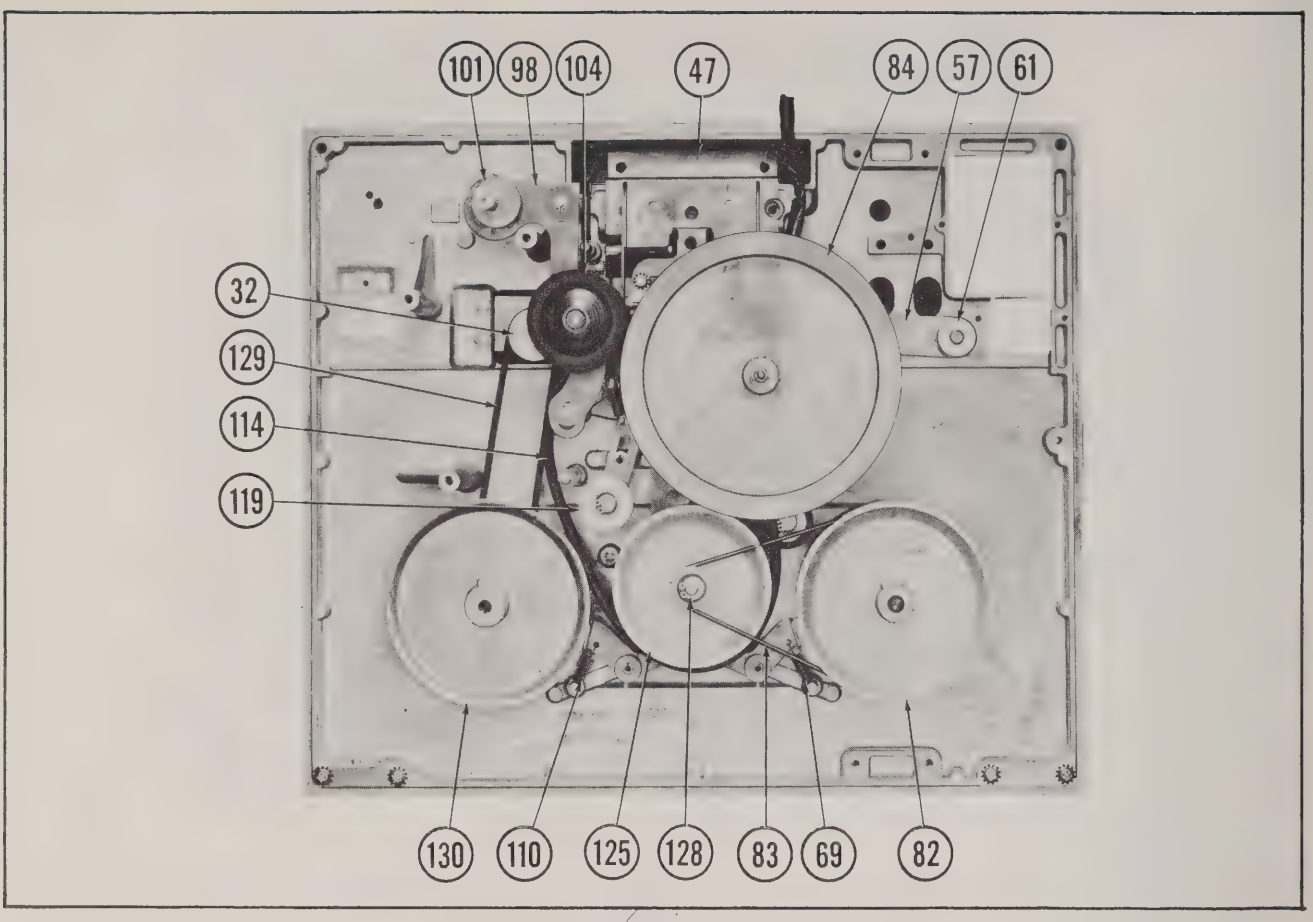


FIGURE 3

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

(a) Cut tape at 60^{o} angle with an overlap so ends will line up. (Cutting tape at 60^{o} angle will eliminate detection of splice on recording.)

(b) Align both ends of tape, with glossy side up.

(c) Cover aligned ends with splicing tape, evenly and securely.

(d) Trim off excess splicing tape. (Cut into the recording tape very slightly.) This eliminates possibility of a sticky splice.

Fast Forward And Fast Rewind-

High speed forward or rewind can be obtained by pressing the desired button. These functions are used primarily in locating a desired portion of a recording in a few seconds. You may press the Fast Forward or Fast Rewind buttons only when recorder is in the "Stop" position.

Program Indicator-

The tape counter or program indicator registers "000" to "999" and will save much guesswork when trying to locate a desired portion of a pre-recorded tape. The reading of the indicator may be noted as the recording is being made so that reference to any given point on the tape may be made very rapidly. When a recorded tape has been so logged or referenced, always "zero" the indicator before starting to play the recording. This should be done before tape is threaded on the take-up reel. Press the "Forward" button and observe the indicator. Use the "Stop Bar" when approaching "000" and then the last few digits can be turned off manually by spinning the take-up reel with the fingers.

Speed Change-

The Power Speed control can turn the instrument "ON" and at the same time select the speed at which you wish to record or playback. This knob locks, and cannot be turned while either the "Fast Forward" or the "Fast Rewind" button is pushed down. When Power Speed control is turned clockwise a speed of 7 1/2 inches per second is obtained, when control is turned counter-clockwise a speed of 3 3/4 inches per second is obtained.

Using Remote Control-

To operate recorder remotely it is only necessary to follow these simple steps after first making sure recorder power if "OFF":

1. Set indicator knob on remote control unit to "OFF".

2. Insert plug of remote control unit into remote control socket at back of tape recorder, found only on model 7-TR-3.

3. Prepare recorder and thread tape as described under "Threading The Tape". Make sure Remote-Local switch is set at "Remote". If you wish to record remotely, set recording level as described under "To Record From Microphone". If you wish to playback remotely, set volume and tone at the recorder. Make sure Voice Music switch is set properly.

4. If you wish to record, push Record key; if you wish to playback, push Play key. You can now operate your recorder remotely.

5. Turn indicator knob on remote control unit to Motor "ON", pause briefly to allow tape to attain proper recording or playback speed, then turn to "Play-Record". The recorder will operate in accordance with the setting of the push buttons on the recorder.

6. To stop the recorder, turn indicator knob of remote control unit to "OFF" pausing briefly again as you pass through Motor "ON" position.

7. When you finish operating recorder remotely, depress stop bar, and make sure you return Remote-Local switch to "Local" position. Turn recorder power "OFF".

ELECTRICAL ADJUSTMENTS

Playback-Record Head Adjustment-

It is very important that play-record head (17) be lined up perfectly with the tape. If it is not, low output, loss of high frequencies or track overlap may result.

1. Thread a standard frequency tape on the recorder.

2. Playing the 1000 cycle part of tape, adjust right hand tape guide (25) for maximum output; adjust left hand tape guide so that tape is approximately level across front of head.

3. While playing the 12, 000 cycle section of tape: adjust head mounting screws (16) for the angular position of head which will give maximum output. Head should be as far forward as possible and mounting screws must be tight.

4. (a) Record a 1000 cycle signal on an unrecorded tape, (b) rewind, (c) depress record button (46) with no signal input so that recorded signal will be erased, (d) rewind again and (e) depress "Play" button. The recorded signal should be reduced at least 40 db during erase. If necessary, to meet this requirement, adjust left hand tape guide (25) down or up to align tape with erase slot in the head.

Oscillator Frequency-

The oscillator frequency is fixed at approximately 45 KC although the frequency is not critical. The oscillator frequency does not require adjustment.

Recording Bias Adjustment-

The recording bias should require adjustment only if the 5879 tube is replaced. The bias adjustment trimmer (M9A) is accessible without removing the recorder mechanism from the cabinet. It is necessary only to remove the bottom cover from the cabinet.

To adjust the bias proceed as follows:

1. Connect an a. c. VTVM to test point TP-1. (See Schematic).

2. Turn the recorder "ON" and depress "Record" pushbutton (46).

3. Turn volume control to minimum (counter-clockwise.)

4. Adjust trimmer (M9A) to obtain meter reading of 0. 46 volts r. m. s.

Recording Level Indicators Adjustment-

Recording level indication is given by two neon bulbs type Ne-51. Indicator level adjustment should be required only if a neon bulb is replaced. The firing level of the recording indicators is adjusted by means of two trimmers (M9B) and (M9C). The trimmers are accessible after the cabinet bottom cover is removed.

To adjust indicator firing level, proceed as follows:

1. Connect a low capacity type a. c. VTVM to test point TP-1. (See Schematic).

2. Connect an audio oscillator, set at 1000 cycle into the Radio-Phono input jack. Use approximately 2 volts input from oscillator.

3. Turn the recorder on and depress "Record" pushbutton.

4. Adjust the volume control to obtain a reading of 1. 0 volt r. m. s. on the VTVM.

5. Adjust the "normal" indicator trimmer (M9B) first clockwise until normal bulb does not light and then slowly counter-clockwise so that upon loosening the trimmer, the normal bulb barely lights.

6. Increase the volume control setting to obtain a reading of 1. 5 volts on the VTVM.

7. Adjust the "overload" indicator trimmer (M9C) first clockwise until "overload" bulb does not light, and then slowly counter-clockwise so that upon loosening the trimmer, the "overload" neon bulb 12 barely lights.

Hum Control Adjustment-

It is very important for playback purposes that the hum control be adjusted.

To set the hum control turn the recorder "ON" and allow the tubes to warm up advance the volume control to maximum and, adjust the hum control (R2) for minimum hum.

MECHANICAL ADJUSTMENTS

Pressure Pad Adjustment-

The tension of the pressure pad spring (R2) is fixed in its mounting and the only adjustment is by the

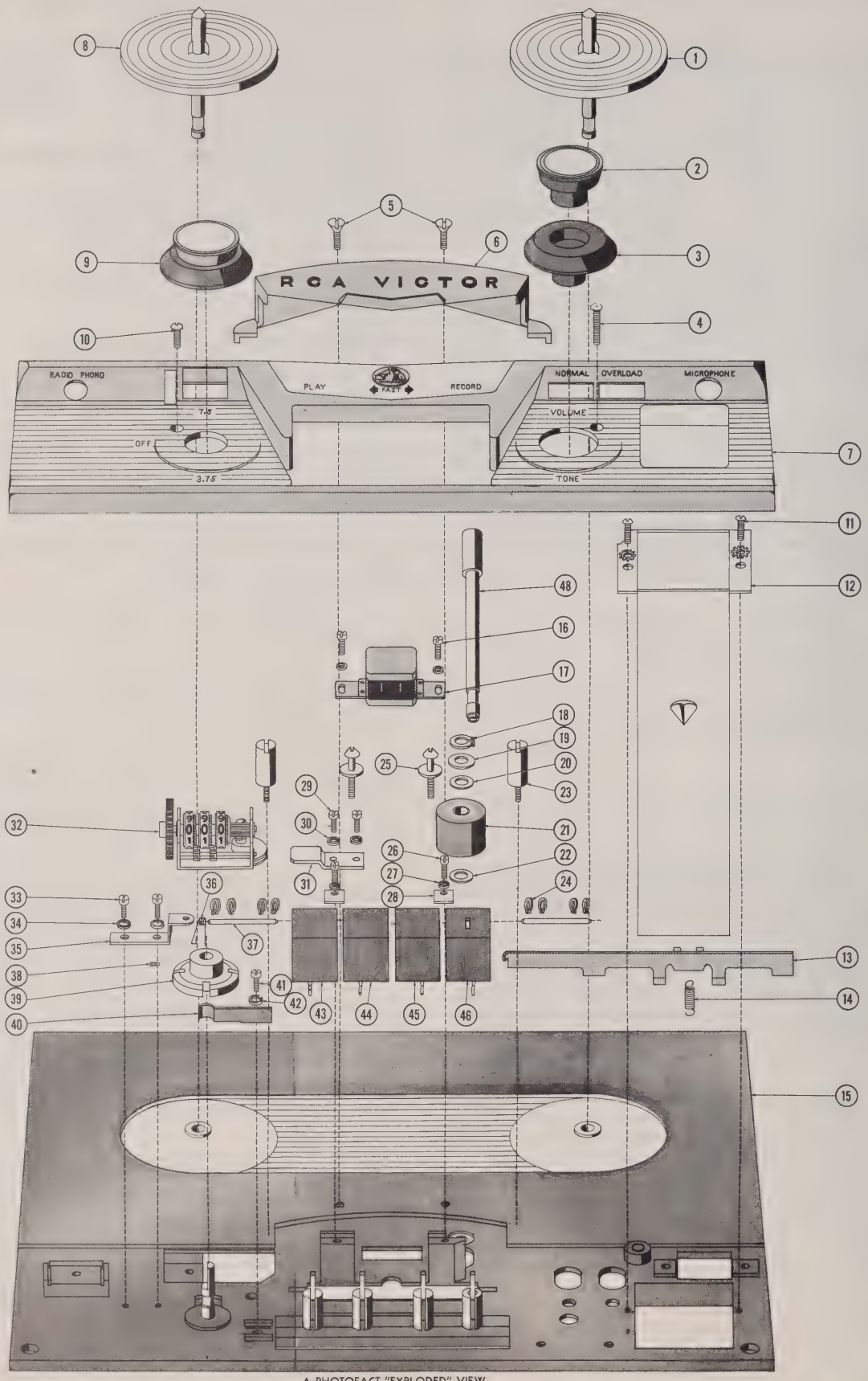


FIGURE 4A. EXPLODED VIEW OF PARTS ABOVE BASEPLATE.

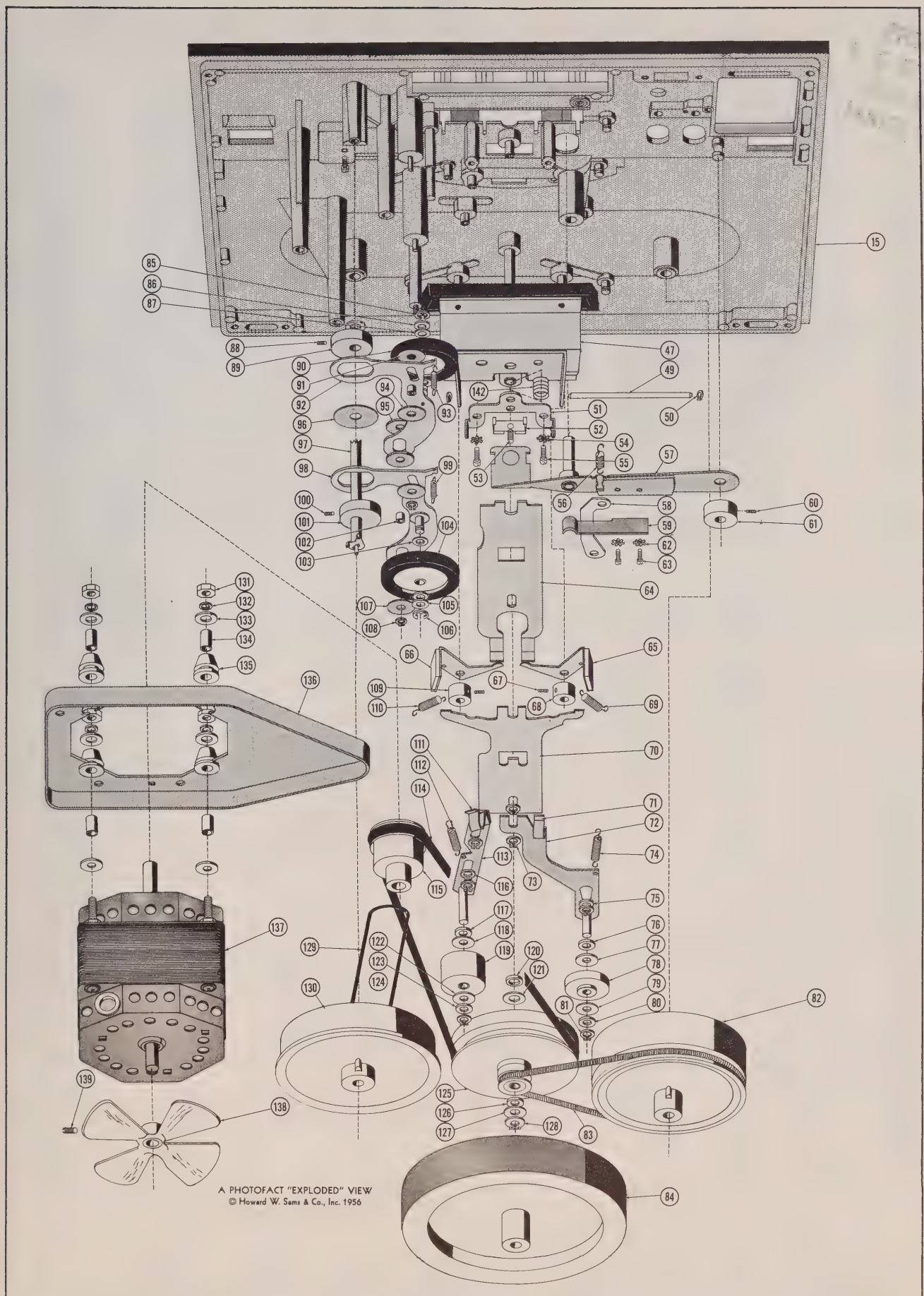


FIGURE 4B. EXPLODED VIEW OF PARTS BELOW BASEPLATE.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Playback Preamplifier Bias Osc.	5879	
V2	AF Amplifier	12AX7	

ITEM No.	USE	TYPE	NOTES
V3	Output	6AQ5	
V4	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA VICTOR PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■30	400	101854			FP145		D-220	R2330*
B	▲30	400				TC77			
C2A	10	250	101946			TCT3764		T-510	R2331*
B	20	350							
C	30	350							
C3	50	6	78573	SRE6V50	BBR50-6	TC29	TD-50-6	MMT-650	TVA-1100
C4	50	6	78573	SRE6V50	BBR50-6	TC29	TD-50-6	MMT-650	TVA-1100
C5	100	25	100552	PRS25V100	BRH251	TC2501	TD-100-25	MTH-2510	TVA-1207
C6	8	10VAC	100509	PRS10VAC8				MT-1516 †	R2201 * Note #1

Note #1. Not used in chassis RS-156B
* Non catalog item.
† Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA VICTOR PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	.01	200	73561	BPD-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C8	390		75641	1469-00039	D6-391	5R5T39	ED-390		MS-339	
C9	1500		75610	1464-0015		1R5D15	ED-1500	MCB456	MS-215	
C10	.22	200	78905	P288N-2?		CUB2P22		GEM-2022	2TM-22	
C11	.047	200	73558	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C12	330		76552	SI330	D6-331	TP43	GP-330	UC-5333	5GA-T33	
C13	.047	200	78921-A	BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C14	820		76864	SI820	D6-820	G067	GP-820	UC-5382	5GA-T82	Note #2
C15	22		101940	SI22	D6-220	TP22	GP-22	UC-5422	5GA-Q22	
C16	.0047	200	101721	BPD-0047	D6-472	CUB6D47	GP-4700	GEM-6247	6TM-D47	
C17	.01	200	73561	BPD-01	D6-103	CUB4S1	GP-10000	GEM-411		
C18	330		76552	SI330	D6-331	TP43	GP-330	UC-5333	5GA-T33	
C19	.047	400	78921A	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C20	220		102015	SI220	D6-221	TP39	GP-220	UC-5322	5GA-T22	
C21	.0068	400	73789	BPD-0068	D6-682	CUB6D68	GP-6800	GEM-6268	6TM-D68	
C22A	4700		76470	BPD-2X0047	DD2-502	DK079	ED-0047	DC525	5HK-2D47	
C22B	4700		76470					DC525		

Note #2. Not used in Model 7-TR-2.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA VICTOR PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	250K	½	971268-20				UE1377	Tone Control
R1B	1Meg	½						Volume Control Tap 250K
R2	100Ω	1www	943078-1					Hum Control

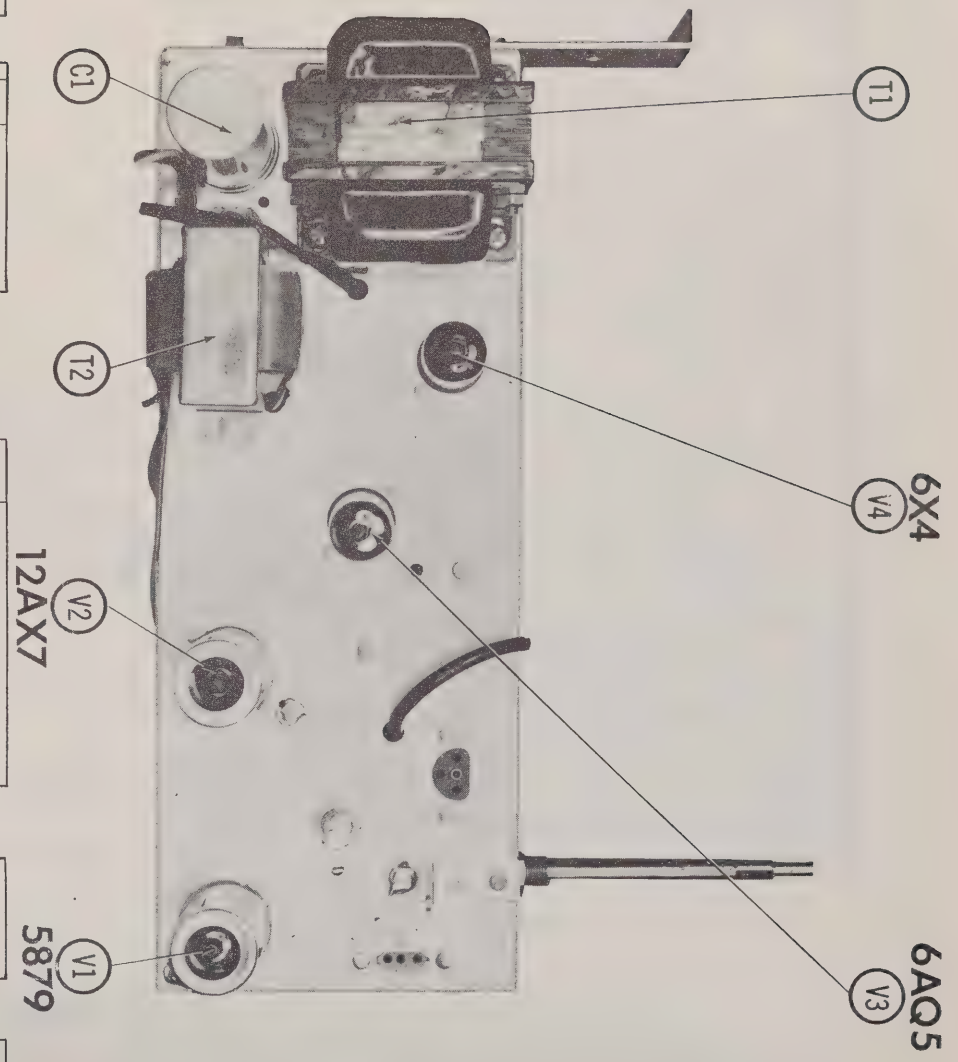
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA VICTOR PART No.	IRC PART No.	
R3	27K		502327	BTS-27K	
R4	47K		502347	BTS-47K	
R5	1.5Meg		502515	BTS-1.5Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA VICTOR PART No.	IRC PART No.	
R6	3300Ω		502233	BTS-3300	
R7	15K		502315	BTS-15K	
R8	470K		502447	BTS-470K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA VICTOR PART No.	IRC PART No.	
R9	3.3Ω	2	100928	BW2-3.3	
R10	390K		502439	BTS-390K	
R11	4.7Meg		30931	BTS-4.7Meg	Note #1
R12	27K		502327	BTS-27K	
R13	47K		502347	BTS-47K	
R14	47K		502347	BTS-47K	
R15	22K		502322	BTS-22K	
R16	33K	1	512333	BTS-33K	
R17	1500Ω		502215	BTS-1500Ω	
R18	33K		502333	BTS-33K	
R19	820K		502482	BTS-820K	
R20	68K		502368	BTS-68K	
R21	470K		502447	BTS-470K	
R22	220K		502422	BTS-220K	
R23	10K		502310	BTS-10K	
R24	3300Ω		502233	BTS-3300	
R25	47K		502347	BTS-47K	
R26	470K		502447	BTS-470K	
R27	1.5Meg		502515	BTS-1.5Meg	
R28	330Ω	1	512133	BTA-330	
R29	330K		502433	BTS-330K	
R30	1Meg			BTS-1Meg	
R31	330K		502433	BTS-330K	
R32	8.2Ω		101852	BW½-8.2	
R33	8.2Ω		101852	BW½-8.2	
R34	470Ω	2	522147	BTB-470	

Note #1. A 390KΩ @ ½W resistor (Part #502439) used in chassis RS-156B only.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA VICTOR PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Osc. Coil	42Ω		101722				

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	RCA VICTOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .59A	450VCT @ .040A	6.3V @ 1.8A		101720	P9202 ①	P-3147	PC-8418	24R00U ①	R-6A ①

① Tape 5V Winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA VICTOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.5K	3-4Ω	101718	Z1007	A-3019	A-3823	26S49	S-5Z	

SPEAKER

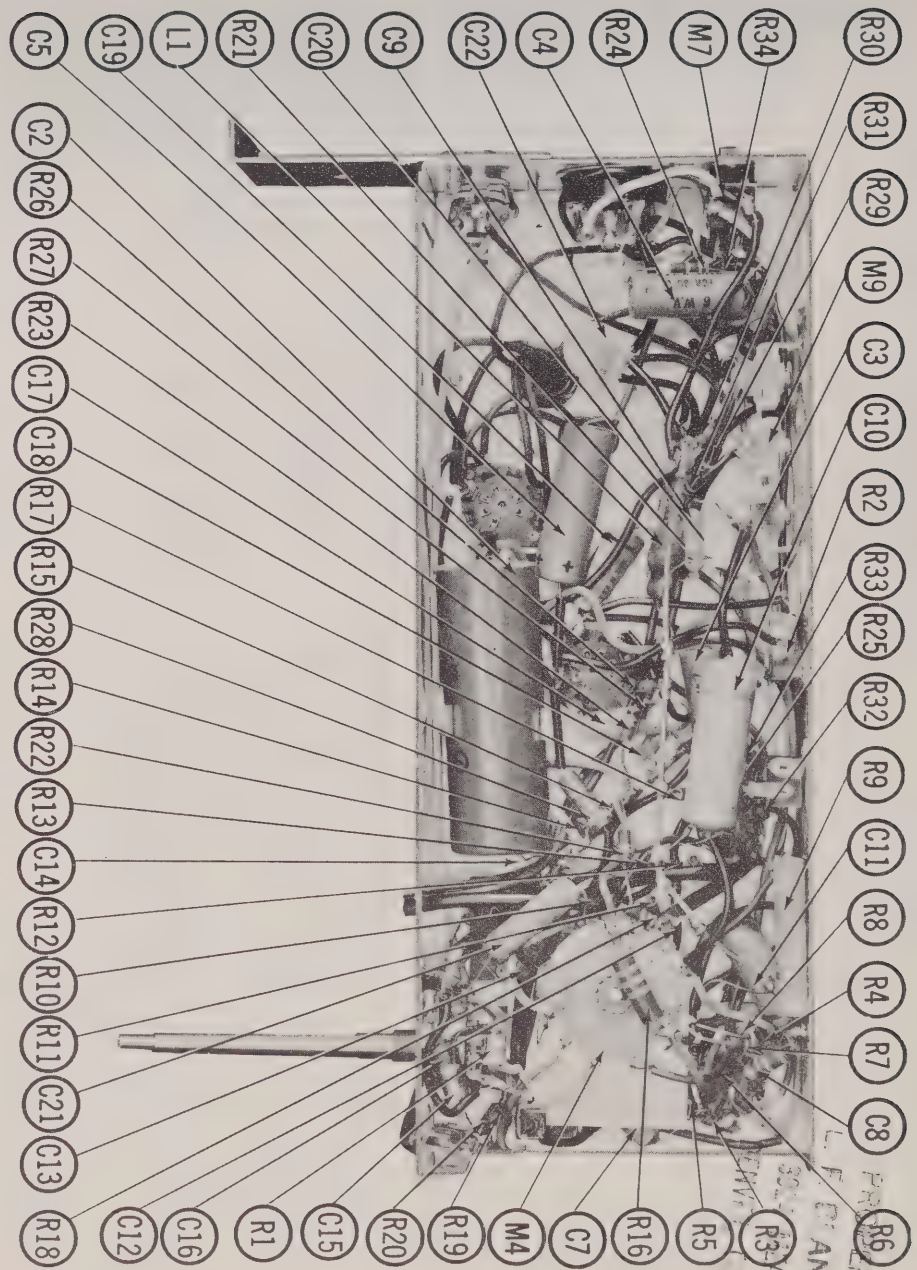
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA VICTOR PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6 1/2"	PM	3-4Ω	100464	6A21	229S1	① Used in Model 7-TR-2.
SP2	3 1/2"	PM	6.6Ω	100465	3A15TZ6.6		SP1, SP2, & SP3 used in Model 7-TR-3 only.
SP3	3 1/2"	PM	6.6Ω	100465	3A15TZ6.6		
	5X7	PM		101958 ①			

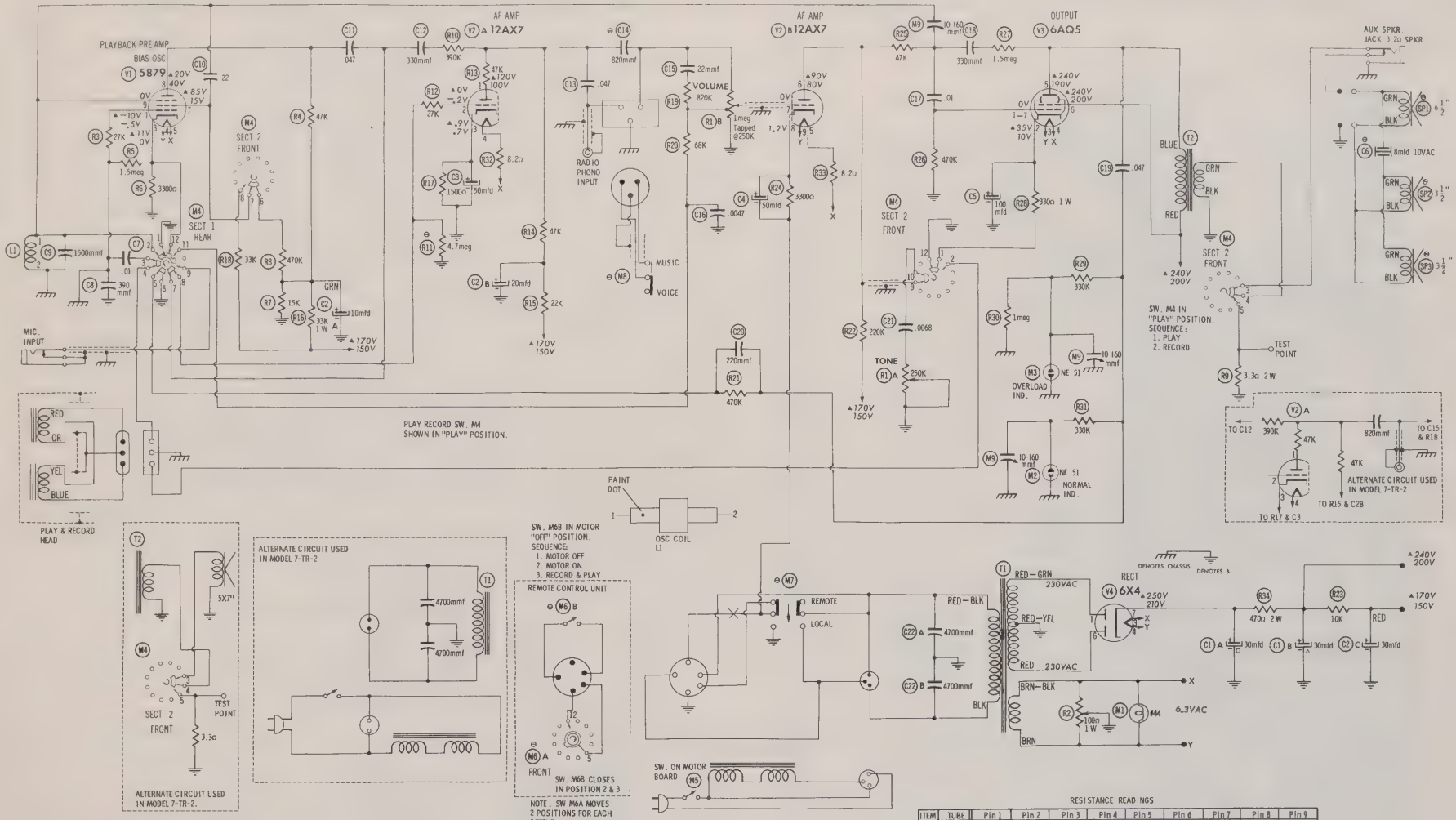
MISCELLANEOUS

ITEM No.	PART NAME	RCA VICTOR PART No.	NOTES
M1	Pilot Lamp		#44
M2	Neon Lamp		#NE51 Normal Record Indicator
M3	Neon Lamp		#NE51 Overload Record Indicator
M4	Switch	101745	Record-Play, 2 Gang (Rotary Wafer Type)
M5	Switch	101484	On-Off (Part of Tape Transport Mech.)
M6A	Switch		Remote Control Selector (Rotary Wafer Type) Note #1
B		102005	Remote Control Power Switch
M7	Switch	101856	Remote-Local Selector (DPDT Slide Type) Note #1
M8	Switch	101870	Voice-Music (SPDT Slide Type) Note #1
M9	Trimmer Cap	101717	3 Gang (10-160mmf, 10-160mmf, 10-160mmf)
	Handle	101912	Model 7-TR-2
	Handle	101715	Model 7-TR-3
	Knob	101704	On-Off-Speed Selector
	Knob	101706	Tone
	Knob	101705	Volume

Note #1. Used in Model 7TR-3 Chassis RS-156 Only.

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	5879	1.7Meg	TP	0Ω ▲3300Ω	23Ω	23Ω	TP	† 550K † ▲ 43K	†90K	40Ω-
V2	12AX7	†120K	5.3Meg	1500Ω	26Ω	26Ω	†230K	18Ω	3300Ω	23Ω
V3	6AQ5	470K	330Ω	23Ω	23Ω	†750Ω	†470Ω	470K		
V4	6X4	280Ω	NC	23Ω	23Ω	NC	280Ω	40K		

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE NOTED.
▲ MEASURED IN "RECORD" POSITION.
NC NO CONNECTION
† MEASURED FROM PIN 7 OF V4.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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front-to-rear position of the Record/Play head (17). Although the mounting lugs of the head are slotted, the correct position of the head is as far forward as possible.

The pressure pad assembly must not bind on its mounting when pressed against the head. There must be clearance between the retaining lugs of the pad assembly and its mounting.

Brake Pad Adjustment-

Both brake pads (66 and 65) should engage their respective drums with equal force and at their respective drums with equal force and at the same instant. The brake pads should engage the drums (82 and 130) with the maximum pad area-brake arm must not be bent at an angle to equalize timing. Unequal brake pad wear will be due to a rough brake drum.

Brake pad adjustment is accomplished by bending the ends of the brake arm actuating lever (64). For access to ends of actuating lever, remove drive pulley (115).

Pressure Roller Adjustment-

The pressure roller (21) holds the tape tight against the capstan (48) during Record and Play. The force is mainly derived from the formed spring (59) on the pressure roller arm (57). One mounting hole of the spring is slotted to permit adjustment.

To determine spring tension: — loop a string over that part of the pressure roller arm (57) on which the pressure pad assembly (52) is mounted and, with a spring scale, measure the force necessary to pull the pressure roller away from the capstan. With a direct pull on the string (string in slot between "Rewind and "Fast Forward" pushbuttons), a force of 4 to 6 pounds should be necessary to pull the pressure roller away from the capstan.

TROUBLES

Fails To Erase-

1. Weak output tube 6AQ5.
2. Left hand tape guide (25) improperly adjusted.
3. Open erase coil in head (17).
4. Incorrect value of resistance (R28), high resistance or open cathode circuit will result in insufficient current or no current in erase coil.

No Drive On Takeup Reel-

1. Takeup drive belt (83) loose or broken.
2. Takeup hub (1) bearing binding.
3. Tape improperly threaded.

Breaking Of Tape-

Frequent breaking of tape may be caused by improper adjustment of brakes, See "Brake Pad Adjustment".

No Fast Forward Or Rewind-

1. Broken pressure spring on arm (116) or arm (72).
2. Fast forward drive idler (78) or rewind drive idler (119) missing.

"Record" Or "Play" Pushbuttons Cannot Be Depressed-

Latch bar tension spring (14) missing.

Speed Change Control Cannot Be Turned-

1. Latch bar tension spring (24) loose or broken.
2. Latch bar bent. Bar remains engage with dentent collar.

Tape Overruns Or Spills When Stop Bar Is Depressed During Fast Forward Or Rewind-

1. Brakes not adjusted properly ("See Brake Pad Adjustment").
2. Brake pads worn out.
3. Brake spring (69 and 110) loose or missing.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	101469	Right Hand Reel Hub & Shaft Assembly			Interlock Bar
2		Volume Knob	14	101514	Interlock Bar Tension Spring
3		Tone Knob	15	101444	Motorboard Subassembly For TR-2-1
4		#6-32 x 3/4" Fil. Head Screw		101908	Motorboard Subassembly For TR-2-2
5		#8-32 x 1/2" Long Screw	16		#6-32 x 1/4" Fil. Head Screw
6	101525	Escutcheon For TR-2-1	17	101494	Record/Play/Erase Head
	101911	Escutcheon For TR-2-2	18	101501	Grip Ring (retainer)
7	101703	Front Control Escutcheon For TR-2-1	19	101507	Flat Metal Washer
	101910	Front Control Escutcheon For TR-2-2	20	101523	Cambric Washer
8	101471	Left Hand Reel Hub & Shaft Assembly	21	101475	Tape Pressure Roller
9		On-Off & Speed Control	22	101523	Cambric Washer
10		#6-32 x 3/8" Long Screw	23	101956	Tape Guide Post (2 req'd.)
11		#6-32 x 3/16" Binding Head Screw	24	101517	Grip Ring (retainer)
12	101707	Microphone Housing (Well)	25	101493	Tape Guide Post (2 req'd.)
13	101483	Fast Forward Or Rewind	26		#6-32 x 1/4 Fil. Head Screw
			27		#6 Split Lockwasher
			28	101487	Retainer-Pushbutton Assembly
			29		#6-32 x 1/4" Fil. Head Screw

MECHANICAL PARTS LIST (Con't.)

Ref. No.	Part No.	Description
30		#6 Split Lockwasher
31		Pilot Light Bracket
32	101480	Tape Counter (Used On TR-2-1 Only)
33		#6-32 x 1/4" Fil. Head Screw
34		#6 Split Lockwasher
35		Front Escutcheon Mounting Bracket
36	101744	Pushbutton Return Spring
37	101486	Pivot Shaft For Pushbutton
38	14974	#8 x 3/16" Set Screw
39	101481	Interlock Detent Collar
40	101454	Speed Change Detent Spring
41		#6-32 x 3/16" Fil. Head Screw
42		#6 Split Lockwasher
43	101464	"Play" Button & Cam Assembly
44	101466	"Fast Forward" Button Cam Assembly
46	101491	"Record" Button & Safety Lever Assembly
47	101478	Stop Bar (Plastic Bar Only)
48	101474	Capstan Shaft
49	101516	Pushbutton Shaft
50	101517	Grip Ring (retainer)
51	101452	Pushbutton Latch Mounting Bracket
52	101490	Pressure Pad Assembly
53	101479	Pressure Pad Spring
54		Washer #6
55		Screw #6-32 x 3/16" Fil. Head
56	71099	Pressure Roller Arm Return Spring
57	101449	Pressure Roller Arm
58	101957	Pressure Roller Arm Support Plate
59	101450	Pressure Roller Arm Formed Spring
60	101592	Set Screw #8-32 x 1/4"
61	101448	Pressure Roller Arm Retaining Collar
62		Washer - #6 External Tooth Lockwasher
63		#32 x 3/16" Fil. Head Screw
64	101446	Brake Release Slide
65	101499	Brake R. H. Brake Arm With Pad
66	101497	Brake L. H. Brake Arm With Pad
67	101592	#8-32 x 1/4" Set Screw
68	101767	Brake Arm Retaining Collar
69	101511	Brake Arm Spring
70	101451	Pressure Roller Arm Actuating Slide
71		Clip
72	101447	Fast Forward Drive Roller Actuating Slide Assembly
73	101500	Grip Ring
74	71099	Pressure Roller Arm Return Spring
75	101500	Grip Ring
76	101503	Rubber Washer 3/8" O. P.
77	101502	Phenolic Washer 1/2" O. P.
78	101463	Fast Forward Drive Roller (Rubber)
79	101502	Phenolic Washer 1/2" O. P.
80	101503	Rubber Washer 1/2" O. P.
81	101500	Grip Ring
82	101470	Takeup Drive Pulley
83	101445	Takeup Drive Belt, Coil Spring
84	101476	Capstan Drive Flywheel
85	101508	"C" Ring (retainer)
86	78719	Flat Washer (Metal)
87	74078	Cambric Washer
88	101505	#6-32 x 1/4" Set Screw
89	101455	Speed Changer Eccentric
90	101492	Speed Change Idler Wheel
91	101521	Phenolic Washer
92	101520	Arm - 7.5"/ sec. Speed Change Arm
93	101512	Speed Changer Arm Spring
94	101521	Phenolic Washer
95	101521	Phenolic Washer
96	101522	Phenolic Washer
97	101453	Speed Change Shaft & Lever
98	101519	3.75"/ sec. Speed Change Arm
99	101512	Speed Change Arm Spring
100	101505	#6-32 x 1/4" Set Screw
101	101455	Speed Change Eccentric
102	102354	Nylon Bushing 1/8" I. D.
103	71099	Fast Forward Slide Return Spring
104	101482	Speed Change Idler Wheel (3.75"/ sec. Speed)
105	78719	Flat Washer (Metal)
106	101508	"C" Retainer
107	101521	Phenolic Washer
108	101517	Grip Ring
109	101767	Brake Arm Retaining Collar
110	101511	Brake Arm Spring
111		Clip
112	71099	Rewind Slide Return Spring
113	101456	Rewind Drive Idler Actuating Slide
114	101458	Main Drive Belt (Rubber)
115	101473	Motor Drive Pulley
116	101500	Grip Ring
117	101503	Rubber Washer 3/8" O. D.
118	101502	Phenolic Washer 1/2 O. D.
119	101467	Rewind Drive Roller
120	101504	Rubber Washer 1/2 O. D.
121	101591	Phenolic Washer 1/2" O. D.
122	101502	Phenolic Washer 1/2 O. D.
123	101503	Rubber Washer 3/8" O. D.
124	101500	Grip Ring
125	101472	Main Drive Dual Pulley Ass'y.
126	101591	Phenolic Washer 1/2" O. D. x .250 ID x .010" thk.
127	101504	Rubber Washer
128	101501	Grip Ring
129	101457	Counter Drive Belt (Rubber)
130	101468	Rewind Drive Pulley
131		Nut - #10-32 Hex Nut
132		Washer - #10 Split Lockwasher
133		Flat Metal 1/2" O. D. Washer
134	101510	Motor Mounting Spacer
135	101509	Motor Mounting Grommet
136		Motor Mounting Plate & Capstan Shaft Bearing Plate Ass'y.
137	101461	Drive Motor
138	101462	Motor Fan
139		#10-32 x 1/4" Set Screw

PHOTOFACT* Folder

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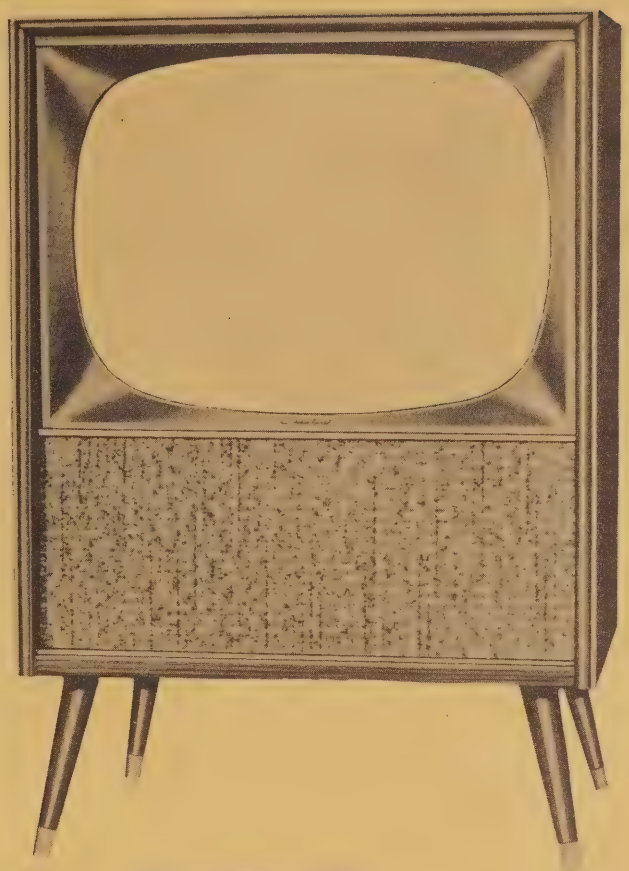

SPARTAN CHASSIS CTA475BB

SPARTAN CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB, CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB (Series 116)

TRADE NAME	Spartan	CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB, CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB ..... 116 Series
MANUFACTURER	Spartan, Division of The Magnavox Co., Fort Wayne, Indiana	
TYPE SET	Television Receiver	
TUBES	Twenty	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.4 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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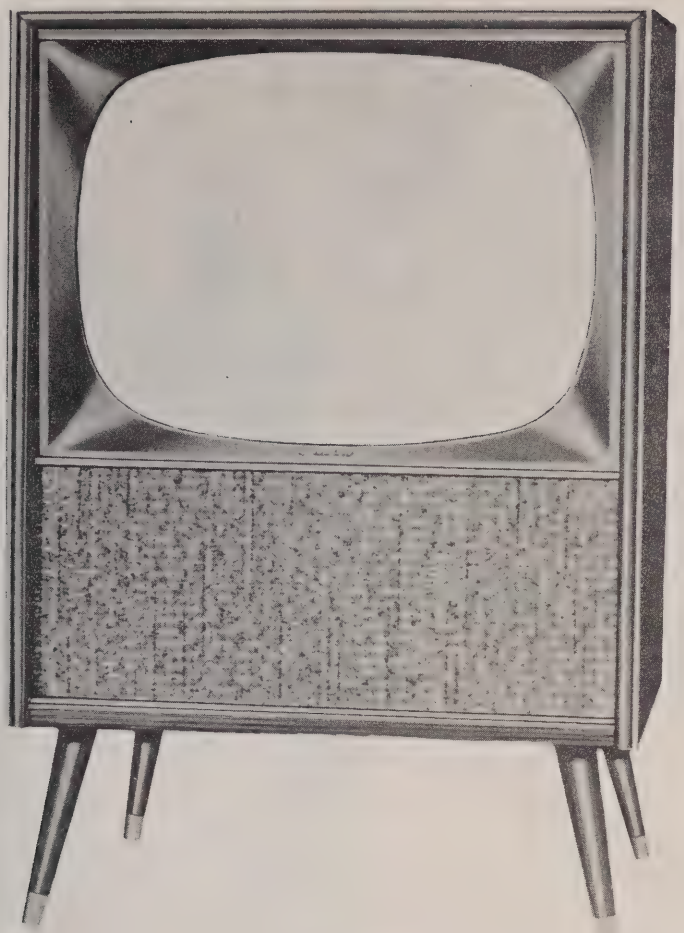

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Remove rear cover and supply power to the chassis. Set the horizontal hold control at its mid-range position and adjust the horizontal frequency slug (L17) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the discriminator located on top of the chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

SPARTAN CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB, CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB (Series 116)

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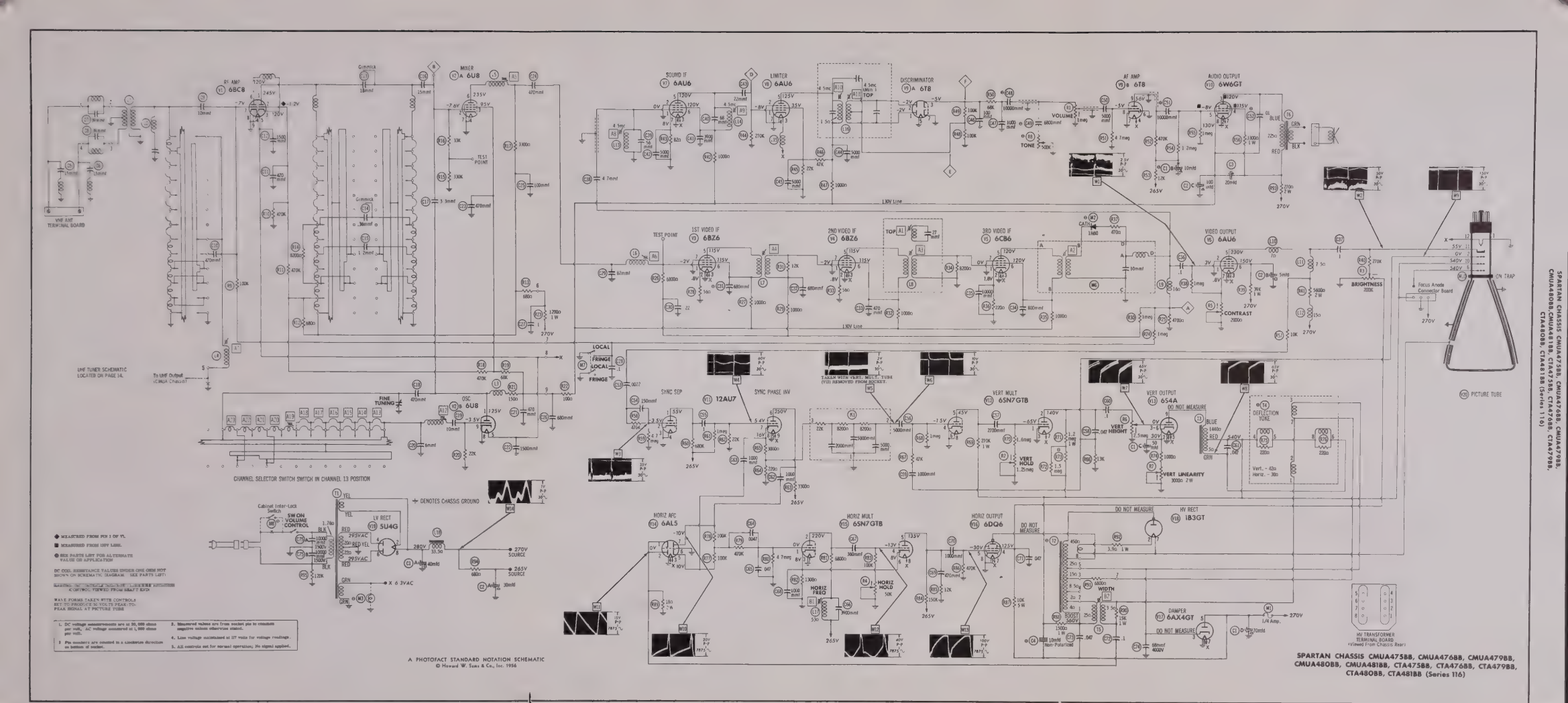
SPARTAN CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB,CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB (Series 116)
SPARTAN CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB, CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB (Series 116)
RF AMP V1 6BC8
MIXER V2A 6U8
SOUND IF V7 6AU6
LIMITER V8 6AU6
DISCRIMINATOR V9A 6T8
AF AMP V9B 6T8
AUDIO OUTPUT V10 6W6GT
1ST VIDEO IF V3 6BZ6
2ND VIDEO IF V4 6BZ6
3RD VIDEO IF V5 6CB6
VIDEO OUTPUT V6 6AU6
SYNC SEP V11 12AU7
SYNC PHASE INV
VERT MULT V12 6SN7GTB
VERT OUTPUT V13 6S4A
OSC V2B 6U8
LV RECT V19 5U4G
NOVAL AFC V14 6AL5
HORIZ MULT V15 6SN7GTB
HORIZ OUTPUT V16 6DQ6
HV RECT V18 1B3GT
DAMPER V17 6AX4GT
PICTURE TUBE V20
VOLUME
TONE
BRIGHTNESS
CONTRAST
VERT HEIGHT
VERT HOLD
VERT LINEARITY
WIDTH
HORIZ FREQ
HORIZ HOLD
BOOST
DEFLECTION YOKE
ION TRAP
Focus Anode Connector Board
VHF ANT TERMINAL BOARD
UHF TUNER SCHEMATIC LOCATED ON PAGE 34.
To UHF Output (CMUA Chassis)
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
FINE TUNING
LOCAL
FRINGE
TAKEN WITH VERT. MULT. TUBE (V12) REMOVED FROM SOCKET.
Cabinet Inter-Lock Switch
SW ON VOLUME CONTROL
DENOTES CHASSIS GROUND
270V SOURCE
265V SOURCE
X 6.3VAC
130V Line
DO NOT MEASURE
HV TRANSFORMER TERMINAL BOARD (Viewed From Chassis Rear)
◆ MEASURED FROM PIN 1 OF V1.
■ MEASURED FROM 130V LINE.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. SEE PARTS LIST.
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 52 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt, AC voltage measured at 1,000 ohms per volt.
2. Measured values are from socket pin to ground; negative values otherwise stated.
3. Pin numbers are counted in a clockwise direction as bottom of socket.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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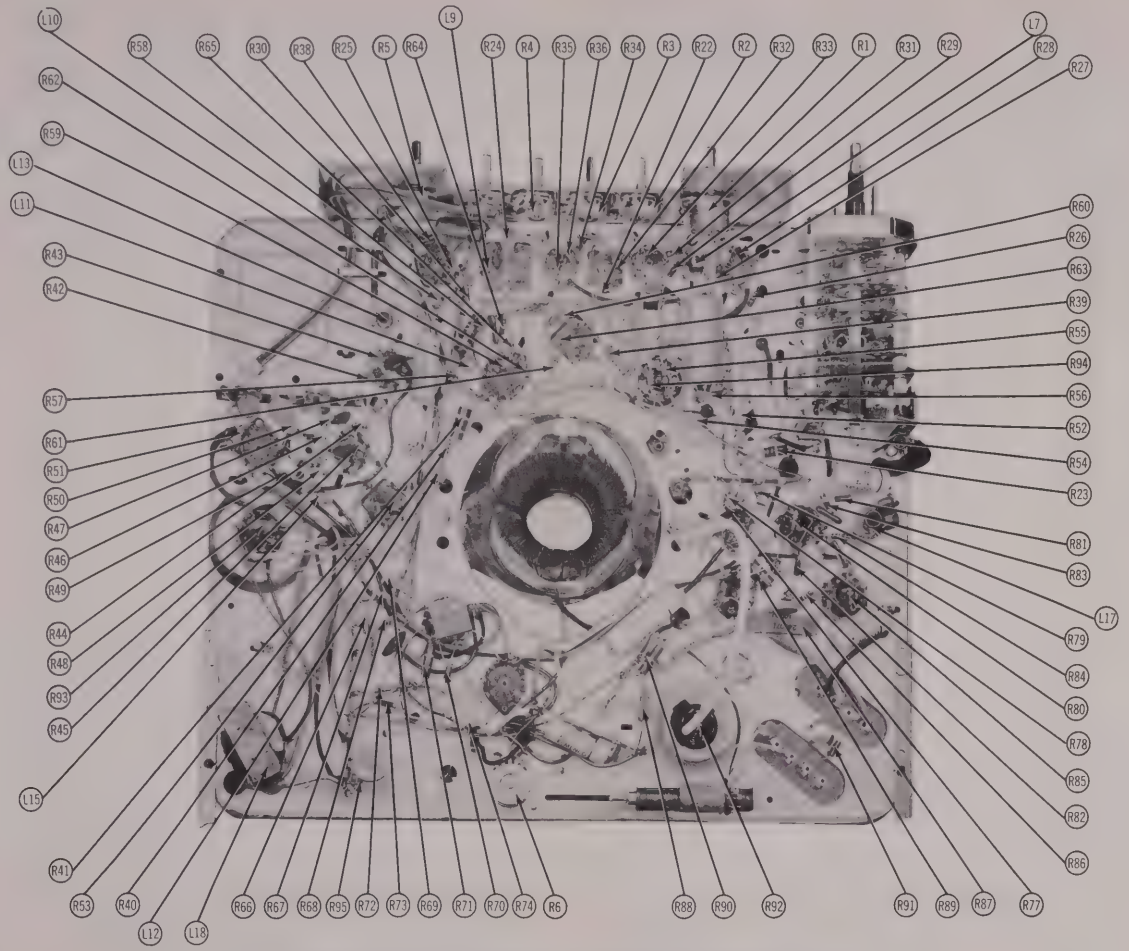
SPARTAN CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB, CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB (Series 116)



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

SPARTAN CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB,CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB (Series 116)

TUBE PLACEMENT CHART

PROPERTY OF
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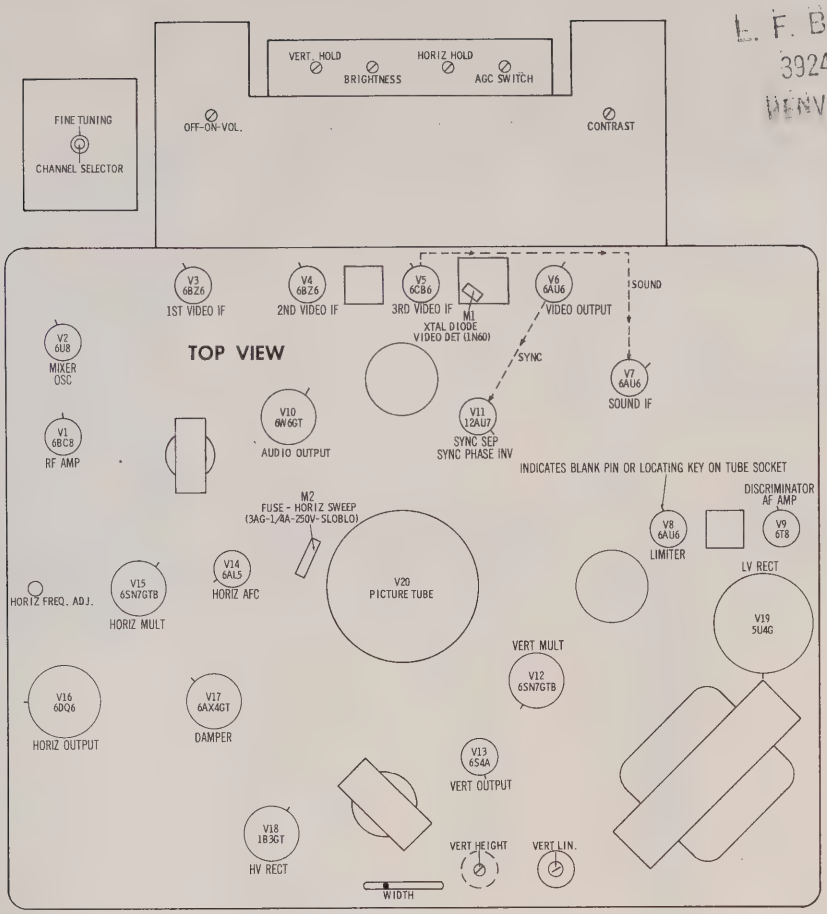
3924 MEADE ST.
DENVER, COLORADO



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V10**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V20**
Has pic, no sound - **V7, V8, V9, V10**

SYNC FAILURE
No vert. sync - **V11, V12**
No horiz. sync - **V11, V14, V15**
No vert. or horiz. sync - **V11**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, Fuse (M1)**
No vertical deflection - **V12, V13**
Poor vert. linearity or foldover - **V12, V13**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V11, V12**
Horiz. off freq. - **V11, V14, V15**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal multivibrator tube (V15) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C30.
Connect positive side to chassis.
In step 1 it is possible to obtain two settings of A1 at which two maximum attenuations will occur. Correct adjustment will be indicated when 47.25MC marker is centered in the trap and the core is farthest out of the coil.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6BZ6 (V3). Low side to chassis.	43.0MC (10MC Swp)	47.25MC	Any unused high band channel	Vert. Amp. thru 10K to point (A). Low side to chassis.	A1	Couple a second generator to point (B) to provide markers. Adjust to center 47.25MC marker in trap notch as in Fig. 1. Use enough sweep output so that trap notch is visable on scope.
2.	"	"	"	42.75MC 45.0MC 45.75MC 47.25MC	"	"	A2, A3, A4	Attenuate sweep generator output for 2 volts peak to peak on scope. Adjust for response similar to Fig. 1. Adjust A2 for maximum gain and MINIMUM tilt. A3 positions 45.75MC marker. A4 positions 42.75MC marker. Recheck A1 adjustment for correct 47.25MC position. See Fig. 1.
3.	"	High side to point (B). Low side to chassis.	"	"	"	"	A5, A6	Adjust A5 for maximum gain and to place 45.75MC marker at 50% on response curve as in Fig. 2. Adjust A6 for maximum amplitude and correct tilt. Repeat adjustment of A5 and A6 (if necessary) several times to obtain response within limits in Fig. 2.
4.	Fig. 3	Thru matching network (Fig. 3) to VHF antenna terminals.	213MC (10MC Swp)	"	13	Vert. Amp. thru 10K to point (A). Low side to chassis.		Couple marker generator loosely to pin 1 (grid) of 6BZ6 (V3). Check for response similar to Fig. 2 on all VHF channels. Response should be within limits shown by dotted lines. If necessary, repeat steps 1 thru 4.
			207MC (10MC Swp)		12			
			201MC (10MC Swp)		11			
			195MC (10MC Swp)		10			
			189MC (10MC Swp)		9			
			183MC (10MC Swp)		8			
			177MC (10MC Swp)		7			
			85MC (10MC Swp)		6			
			79MC (10MC Swp)		5			
			69MC (10MC Swp)		4			
			63MC (10MC Swp)		3			
			57MC (10MC Swp)		2			
5.	1000Ω Carbon Resistor	High side to point C thru 1000Ω. Low side to chassis.	43MC (10MC Swp)	45.75MC	UHF	"	A7	Turn tuner to UHF position. Adjust A7 to place 45.75MC marker at 50% on high frequency slope of response curve (Fig. 2).

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.005MFD	High side to pin 1 (grid) of 6AU6 (V6). Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe thru 10K to point (E). Common to chassis.	A8, A9, A10	Adjust for maximum output. Keep input signal at lowest point possible for an accurate indication.
7.	"	"	"	"	DC probe thru 10K to point (F). Common to chassis.	A11	Adjust for MINIMUM deflection. A positive and negative reading will be obtained on either side of the correct setting.

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Loosely couple an RF signal generator to the grid of the first video IF amplifier tube (V3) and tune it accurately to 45.75MC.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 3	Thru matching network (Fig. 3) to antenna terminals.	213MC (10MC Swp)	211.25MC 45.75MC	13	Vert. Amp. thru 10K to point (A). Low side to chassis.	A12	Adjust so that video RF and video IF markers coincide on response curve.
9.	"	"	207MC (10MC Swp)	205.25MC 45.75MC	12	"	A13	Adjust position of loops so that video RF and video IF markers coincide on response curve.
			201MC (10MC Swp)	199.25MC 45.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 45.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 45.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 45.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 45.75MC	7		A18	
10.	"	"	85MC (10MC Swp)	83.25MC 45.75MC	6	"	A19	Adjust so that video RF and video IF markers coincide on response curve.
11.	"	"	79MC (10MC Swp)	77.25MC 45.75MC	5	"	A20	Adjust (compress or expand coil turns) so that video RF and video IF markers coincide on response curve.
			69MC (10MC Swp)	67.25MC 45.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 45.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 45.75MC	2		A23	

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable.
Alignment of this portion of the receiver should not be required in the field.

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.

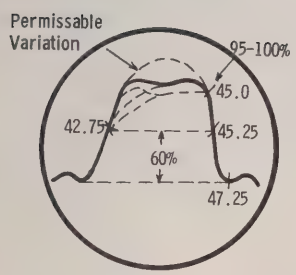


FIG.1

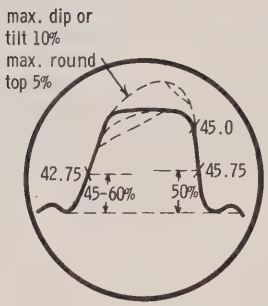


FIG.2

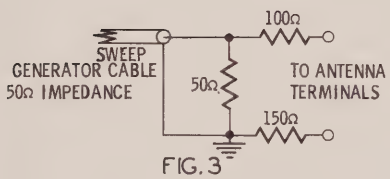


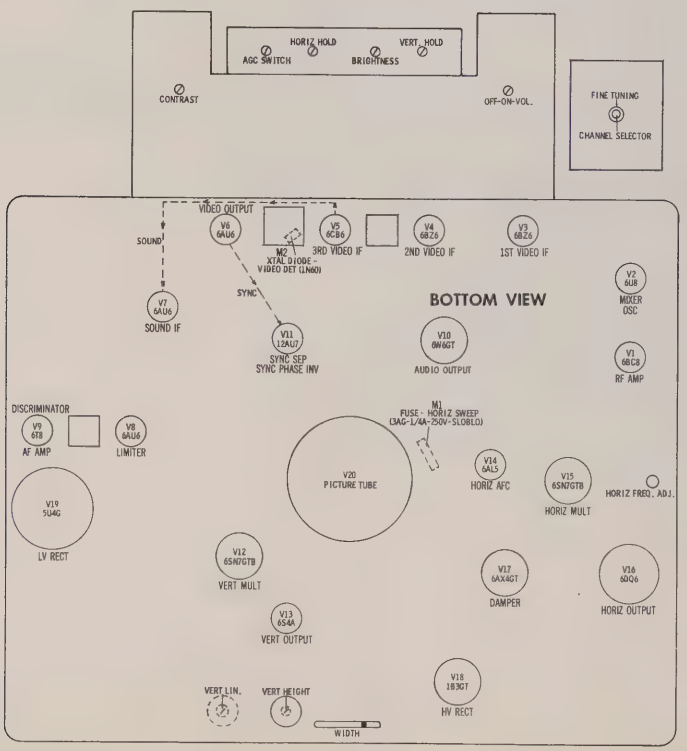
FIG.3

SPARTAN CHASSIS CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB, CMUA481BB, CTA475BB, CTA476BB, CTA479BB, CTA480BB, CTA481BB (Series 116)

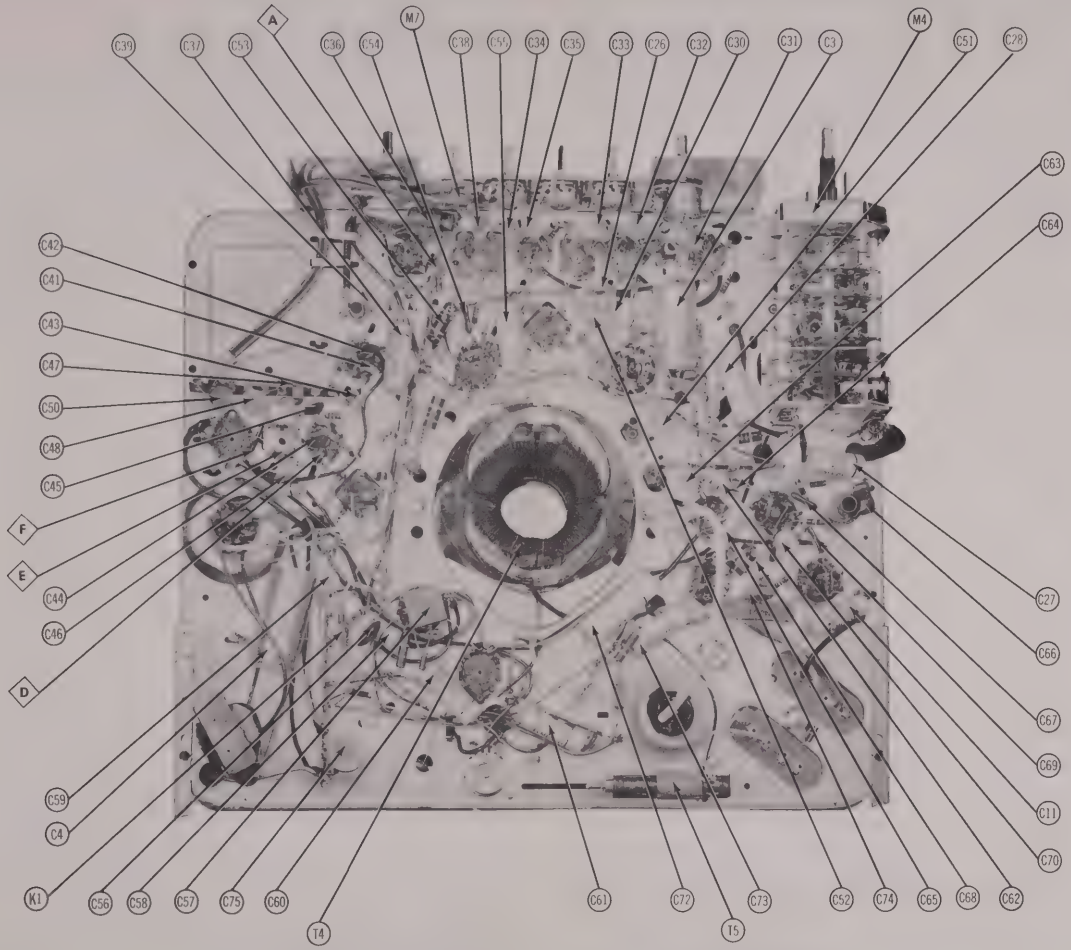
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BC8	†1900Ω	250K	INF	0Ω	.1Ω	INF	1Meg	0Ω	0Ω
V2	6U8	■ 250Ω	360K	■ 68K	0Ω	.1Ω	†5200Ω	0Ω	0Ω	22K
V3	6BZ6	1Meg	56Ω	.1Ω	0Ω	■ 1000Ω	■ 1000Ω	0Ω		
V4	6BZ6	1Meg	56Ω	.1Ω	0Ω	■ 1000Ω	■ 1000Ω	0Ω		
V5	6CB6	.1Ω	220Ω	.1Ω	0Ω	■ 1000Ω	■ 1000Ω	0Ω		
V6	6AU6	1Meg	0Ω	.1Ω	0Ω	†5600Ω	†39K	● 70Ω		
V7	6AU6	.5Ω	0Ω	.1Ω	0Ω	■ 1000Ω	■ 1000Ω	82Ω		
V8	6AU6	270K	0Ω	.1Ω	0Ω	■ 1000Ω	■ 40K	0Ω		
V9	6T8	100K	100K	200K	.1Ω	0Ω	0Ω	0Ω	4.7Meg	†480K
V10	6W6GT	TP	0Ω	†500Ω	†3600Ω	550K	TP	.1Ω	50K	
V11	12AU7	†680K	4.7Meg	0Ω	0Ω	0Ω	†4000Ω	22K	3200Ω	.1Ω
V12	6SN7GTB	● 1.8Meg	*1.5Meg	0Ω	1Meg	*270K	0Ω	.1Ω	0Ω	
V13	6S4A	NC	● 2500Ω	● 1.3Meg	0Ω	.1Ω	● 1.3Meg	NC	NC	*3000Ω
V14	6AL5	18Ω	18Ω	.1Ω	0Ω	5Meg	0Ω	5Meg		
V15	6SN7GTB	4.7Meg	†7500Ω	1300Ω	●110K	†150K	1300Ω	0Ω	.1Ω	
V16	6DQ6	NC	0Ω	NC	†10K	470K	TP	.1Ω	0Ω	TOP CAP *25Ω
V17	6AX4GT	NC	NC	5Meg	NC	†40Ω	NC	.1Ω	0Ω	
V18	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE .								TOP CAP *475Ω
V19	5U4G	NC	60K	TP	20Ω	NC	22Ω	TP	60K	
V20	21ATP4	0Ω	13K	PIN 6 *1500Ω	PIN 10 *1500Ω	PIN 11 ● †320K	PIN 12 .1Ω			

† MEASURED FROM PIN 8 OF V19.
■ MEASURED FROM 130V LINE.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
* MEASURED FROM PIN 3 OF V17.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART



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CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

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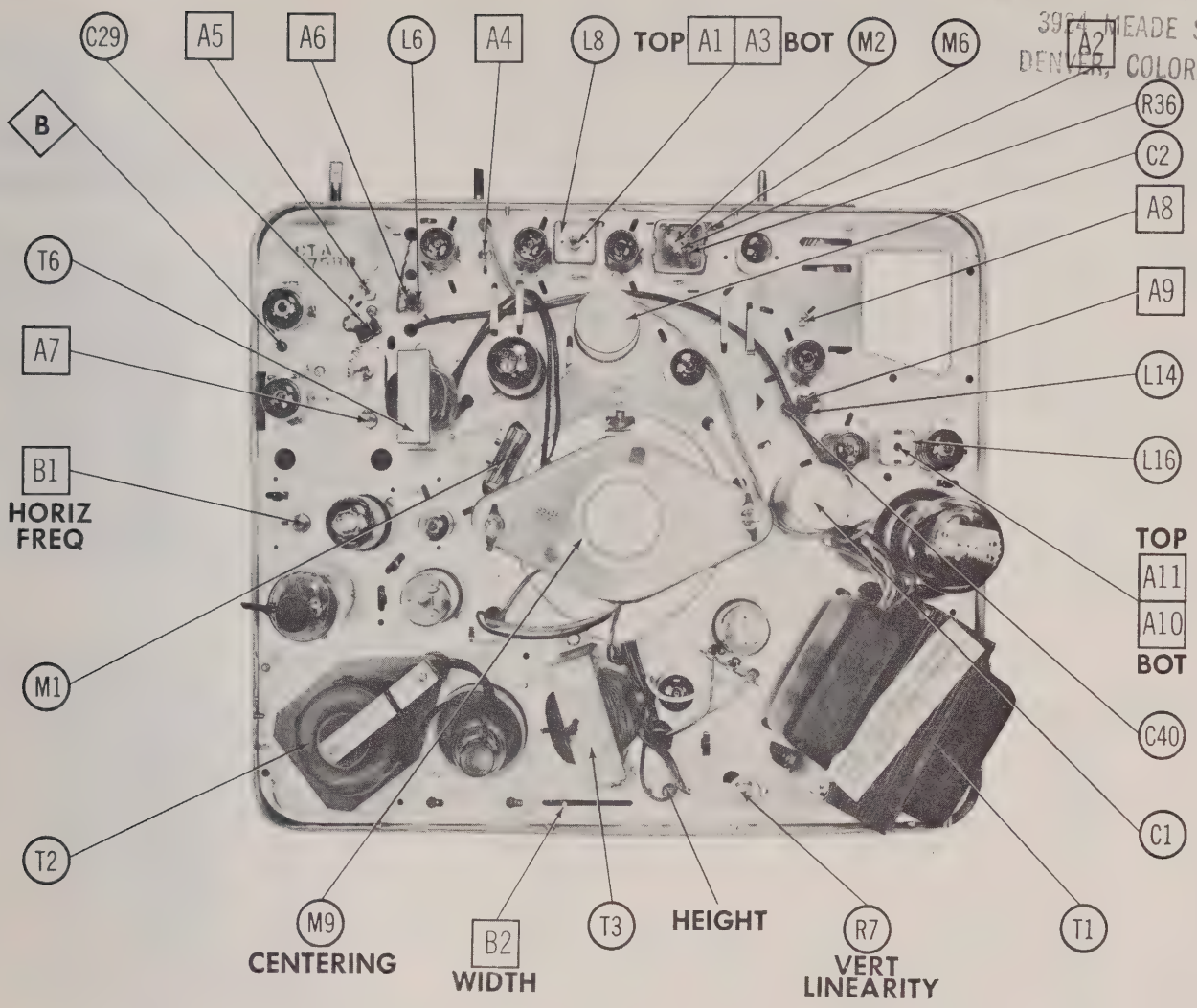


CHASSIS—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the horizontal hold control to the mid-range position. Turn the horizontal frequency slug (B1) slowly clockwise while switching off and on channel until the picture just loses sync. Turn B1 counter clockwise until picture just falls into sync, then turn an additional $\frac{1}{2}$ turn clockwise. The picture should hold sync at both extreme ends of the horizontal hold control.

If necessary, readjust B1 and recheck for sync and pull-in as above. Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BC8	
V2	Mixer-Oscillator	6U8	
V3	1st Video IF Amplifier	6BZ6	
V4	2nd Video IF Amplifier	6BZ6	
V5	3rd Video IF Amplifier	6CB6	
V6	Video Output	6AU8	
V7	Sound IF Amplifier	6AU6	
V8	Limiter	6AU8	
V9	Discriminator-AF Amp.	6T8	
V10	Audio Output	6W6GT	
V11	Sync Separator-Sync Phase Inverter	12AU7	
V12	Vert. Mult.	6BN10TB	
V13	Vert. Output	6S4A	
V14	Horiz. AFC	6AL5	
V15	Horiz. Mult.	6BN10TB	
V16	Horiz. Output	6DQ8	
V17	Damper	6AX4GT	
V18	EV Rectifier	1B3GT	
V19	LV Rectifier	5U4G	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	SPARTAN PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V20	21ATP4	21ATP4 ①	21ATP4A/21ATP4 ①	21ATP4 ② ③ ④	① Aluminized ② Silver screen "BS"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SPARTAN PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.	
C1A	⌀40	250	X700S1-S3	RR1008		FP975.5		T-Ul		
B	⌀10	350	(Note 1)			TC63		MT-0555		
C	50	50								
D	⌀70	350								
C2A	⌀30	350	X700S1-S5	AFH3-1U4-T9				Q-030		
B	⌀40	300						MT-20100		
C	⌀100	300								
C3	30	350	X700S7-20	PRS450V30	RR2035	TC65	TD-30-350	FM-4530	TVA-1608	
C4	10	350	X700S7-25	PRS350V10		TC67		MT-4530		
			(Note E)	10		TC68 ✱		MT-4630		

Note 1. C1B is not used in chassis CTA/CMUA470BB.
Note 2. Non-polarized unit.
✱ Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SPARTAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	15		2S207-9	NP0-S15	D6-150	TZ1J	ED-15		5TCC-Q15	
C6	15		2S207-8	NP0-S15	DF-150	TZ1J	ED-15		5TCC-Q15	
C7	39		2S017S-20	N750-S39	TCN-39	N03I	TC7-39			
C8	39		2S017S-20	N750-S39	TCN-39	N03I	TC7-39			
C9	33		2S032S-S17	NP0-S33	D6-330	TZ3D	ED-33	ZT-541	5TCC-Q1	
C10	470		2S017S-8	BP0-00047	DD-471	K06D	ED-470	UC-5347	5GA-T47	
C11	470		2S017S-8	BP0-00047	DD-471	K06D	ED-470	UC-5347	5GA-T47	
C12	1500		2S017S-10	BP0-0015	DD-152	K07I	ED-1500	DC-5315	5HK-D15	
C13	470		2S017S-8	BP0-00047	DD-471	K06D	ED-470	UC-5347	5GA-T47	
C14	470		2S017S-8	BP0-00047	DD-471	K06D	ED-470	UC-5347	5GA-T47	
C15	100				TC8-100		TC8-100			
C16	680		2S018S-6	DH-00068	DD-681	C06S	XD680	UC-5368	5GA-T68	
C17	.1	400	2S021J-13	P483H-1	DF-104	CUB4P1		PT401	4TM-P1	
C18	.1	200	2S020S-13	P288H-1	DF-104	CUB2P1		PT401	2TM-P1	
C19	53	500	2S032S-236	160-00062	TC2-S2	2ER5Q61	TC0-S3			
C20	.22	200	2S020S-18	P288H-23		CUB1P23		PT4023	2TM-P23	
C21	680		2S021S-6	DH-00068	DD-681	C06S	ED-680	UC-5368	5GA-T68	Note 3
C22	680		2S021S-6	DH-00068	DD-681	C06S	ED-680	UC-5368	5GA-T68	
C23	470		2S018S-15	DH-00047	DD-471	C06D	ED-470	UC-5347	5GA-T47	
C24	820		2S021S-16	DH-0008	DD-801	C06T	ED-0008	MC351	5GA-T8	
C25	500		2S017S-5	DP0-501	DD-501	K06S	ED-51	DC-511	5HK-S1	
C26	.1	200	2S020S-13	P288H-1	DF-104	CUB2P1		PT401	2TM-P1	
C27	.1	200	2S020S-13	P288H-1	DF-104	CUB2P1		PT401	2TM-P1	
C28	4.7		2S022J-23	NP0-S4.7	TC2-4R7	TZ07	TC0-4.7	ZT-5547	5TCCB-V47	
C29	56		2S021S-33	N750-S56	TCN-56	M05M	TC7-56			
C30	68		2S021S-7	N750-2S68	TCN-68	M03S	TC7-68		5TCU-Q68	
C31	3900		2S017S-31	BP0-004	DD-402	K07B	ED-004	UC-5340	5GA-D39	
C32	5600		2S018S-7	BP0-005	DD-502	K06E	ED-005	DC-525	5HK-D5	
C33	22		2S720T-C2	S2J3	D6-220	TP2Z	GP-22	UC-5422	5GA-Q22	
C34	5000		2S017S-1	BP0-005	DD-502	K06S	ED-005	DC-525	5HK-D5	
C35	5000		2S017S-1	BP0-005	DD-502	K06S	ED-005	DC-525	5HK-D5	
C36	100		2S020T-46	S1D3	D6-101	TP3H	GP-100	UC-531	5GA-T1	
C37	1000		2S018J-9	DI-001	DD-102	K06E	ED-001	DC-511	5HK-E1	
C38	10000		2S017S-6	BP0-01	DD-103	K08Z	ED-01	DC-511	5HK-S1	Note 4
C39	5000		2S017S-1	BP0-005	DD-502	K06S	ED-005	DC-525	5HK-D5	Note 5
C40	5000		2S017S-1	BP0-005	DD-502	K06S	ED-005	DC-525	5HK-D5	
C41	10000		2S017S-6	BP0-01	DD-103	K08Z	ED-01	DC-511	5HK-S1	Note 6
C42	.01	600	2S020T-1	BP0-01	DE-103	CUB8S1	GP-10000	PT611	6TM-S1	Note 7
C43	.0022	400	2S021J-3	BP0-0022	DE-222	CUB6U22	GP-222	PT6222	6TM-D22	
C44	530		2S022S-234	SD1-0	DE-121	2ER5T15	ED-150	MC356	2TM-S1	
C45	.1	600	2S021J-13	P488H-1	DF-104	CUB4P1		PT401	4TM-P1	
C46	5000		2S018J-15	1464-001		1CR5D5		MCB485	MB-35	
C47	2700	500	2S018S-1048	1464-0027		1R5D27			MB-327	
C48	.047	400	2S021J-7							
C49	1000	-	2S021S-8	1464-001		1R5D1	ED-1000	MCB355	MB-31	
C50	.1	400	2S021J-13	P488H-1	DF-104	CUB4P1		PT401	4TM-P1	
C51	.047	400	2S021J-11	BP0-05	DF-503	CUB4S47		PT4047	4TM-S47	
C52	1000		2S021S-8	1464-001		1R5D1	ED-1000	MCB385	MB-31	
C53	1000		2S021S-8	1464-001		1R5D1	ED-1000	MCB355	MB-31	
C54	.0047	400	2S021J-4	1464-0047		1R5D47			MB-347	
C55	.047	400	2S021J-5							
C56	2200	500	2S022S-468	1464-0039	-	1R5D39			MB-339	
C57	330	500	2S022S-343	1469-00038		5R5T38			MB-338	
C58	1000		2S021S-8	1464-001		1R5D1	ED-1000	MCB355	MB-31	
C59	470	500	2S022S-346	1464-00047		D6-471	SR5T47	ED-470	MB-347	
C60	1000		2S021S-8	BP0-05		DD-102	C06S	ED-1000	5GA-D1	
C61	.047	400	2S021J-11	BP0-05		DF-503	CUB4S47		PT4047	4TM-S47
C62	.1	600	2S020J-13	P488H-1		DF-104	CUB4P1		PT401	6TM-P1
C63	.047	400	2S021J-11	BP0-05		DF-503	CUB4S47		PT4047	6TM-S47

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SPARTAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C74	68	4000	2S017S-23	HVD-60-68		CUB3S81		PT181	MB-81	
C75A	10000	1500	2S031P-3	P588N-01	DDI5-103	CUB3S81		PT181	MB-81	
B	10000	1500		P588N-01	DDI5-103	CUB3S81		PT181	MB-81	

Note 3. Some versions may use 6000MMF in this application (Part #2S021S-14).
Note 4. Chassis CTA/CMUA480BB and 481BB use 6000MMF in this application (part #2S017S-1).
Note 5. Used in chassis CTA /CMUA478BB only.
Note 6. Chassis CTA/CMUA479BB, 480BB and 481BB use .0039MFD in this application (part #2S031J-3).
Note 7. Chassis CTA/CMUA478BB use 470MMF in this application. Chassis CTA/CMUA480BB and 481BB use .015MFD.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA						INSTALLATION NOTES
	RESISTANCE	WATTS	SPARTAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.		
R1A	1Meg	½	D330I36-48	AB-70	A47-1Meg-A	Q13-137	U53	Volume	
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A	
C	Switch		Not Req.	KB-1	SWS-12	TS-1	UB-38	Attach to R1A	
R2A	1.25Meg	½	D330I39-9	AB-742		QU-136	TA1S5L	Vert Hold	
B	Shaft		Not Req.	AK-3		VQ	Not Req.	Attach to R2A - Note 2	
R3A	300K	½	D320J29-11	AB-48		QU-129	TA254L	Brightness control	
B	Shaft		Not Req.	AK-3		VQ	Not Req.	Attach to R3A - Note 2	
R4A	50K	½	D330I26-7	AB-31		QU-123	TA54L	Horiz. Hold	
B	Shaft		Not Req.	AK-3		VQ	Not Req.	Attach to R4A - Note 2	
R5A	3000 Ω	½	D330I32-45	AB-705	A47-3000-B	QU-131	U8	Contrast control	
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R5A	
R6A	3.5Meg	½	D320I46-3	B-53	A47-3.5Meg -B	QU-139	TA250L	Vert. Height	
B	Shaft			AE-1	FKS-44	RQ	Not Req.	Attach to R6A	
R7	3000Ω	½	2S012S-3		39-3000			Vert. Linearity	
R8	500K		2S023S-48					Tone Control - Note 1	

Note 1. Used in Ch. CTA/CMUA478BB only.
Note 2. Fits to desired size.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SPARTAN PART No.	IRC PART No.	
R9	100K		2S104-86	BTS-100K	
R10	470K		2S104-94	BTS-470K	
R11	470K		2S104-94	BTS-470K	
R12	680Ω		2S104-60	BTS-680	
R13	680Ω		2S104-60	BTS-680	
R14	8200Ω		2S104-73	BTS-8200	
R15	330K		2S104-90	BTS-330K	
R16	33K		2S104-50	BTS-33K	
R17	330Ω		2S104-69	BTS-330	
R18	470K		2S104-94	BTS-470K	
R19	68K		2S104-82	BTS-68K	
R20	33K		2S104-78	BTS-33K	
R21	150Ω		2S104-52	BTS-150	
R22	100Ω		2S104-49	BTS-100	
R23	1200Ω	1	2S104-53	BTA-1200	
R24	1Meg		2S104-98	BTS-1Meg	
R25	4700Ω 5%		2S099M-175	BTS-4700 5%	
R26	68000Ω 5%				
R27	1000Ω		2S104-62	BTS-1000	
R28	56Ω		2S104-47	BTS-56	
R29	1000Ω		2S104-62		
R30	1Meg		2S104-98	BTS-1Meg	
R31	12K 5%				
R32	1000Ω		2S104-62	BTS-1000	
R33	56Ω		2S104-47	BTS-56	
R34	56000Ω 5%				
R35	1000Ω		2S104-62	BTS-1000	
R36	1200Ω		2S104-63	BTS-1200	
R37	470Ω		2S104-58	BTS-470	
R38	1Meg		2S104-98	BTS-1Meg	
R39	39Ω	1	2S103S-81	BTA-39K	
R40	270K	2	2S103S-71	BTS-270K	
R41	5600Ω		2S103S-71	BTS-5600	
R42	1000Ω		2S104-62	BTS-1000	
R43	82Ω		2S104-48	BTS-82	
R44	270K		2S104-91	BTS-270K	
R45	33K		2S104-78	BTS-33K	
R46	47K		2S104-86	BTS-47K	
R47	1000Ω		2S104-62	BTS-1000	
R48	100K		2S104-86	BTS-100K	
R49	100K		2S104-86	BTS-100K	
R50	68K		2S104-84	BTS-68K	
R51	4.7Meg		2S104-106	BTS-4.7Meg	
R52	470K		2S104-94	BTS-470K	
R53	33K		2S104-78	BTS-33K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SPARTAN PART No.	IRC PART No.	
R54	1.35Meg	5%	2S099M-253	BTS-1.35Meg 5%	
R55	1Meg 5%		2S099M-231	BTS-1Meg 5%	
R56	330Ω	1	2S103S-56	BTA-330Ω	
R57	10K		2S104-74	BTS-10K	
R58	470K		2S104-94	BTS-470K	
R59	4.7Meg		2S104-106	BTS-4.7Meg	
R60	680K		2S104-96	BTS-680K	
R61	10Meg		2S104-99	BTS-10Meg	
R62	22K		2S104-76	BTS-22K	
R63	33001 5%		2S099M-171	BTS-3300	
R64	220Ω		2S104-54	BTS-220	
R65	10000 5%		2S099M-190	BTS-10000	
R66	13K 5%			BTS-13K	
R67	47K		2S104-82	BTS-47K	
R68	1Meg		2S104-98	BTS-1Meg	
R69	270K	1	2S103S-91	BTA-270K	
R70	1.6Meg 5%		2S099M-235	BTS-1.6Meg 5%	
R71	1.5Meg	1	2S103S-99	BTA-1.5Meg	
R72	1.5Meg		2S104-100	BTS-1.5Meg	
R73	+				
R74	3000Ω		2S104-82	BTS-3000	
R75	330Ω		2S104-54		
R76	330Ω		2S104-54	BTS-330	
R77	100K		2S104-86		
R78	100K		2S104-86	BTS-100K	
R79	47K		2S104-86	BTS-470K	
R80	4.7Meg		2S104-106		
R81	680Ω		2S099M-179		
R82	3001 5%		2S099M-102		
R83	100K 5%		2S099M-207		
R84	150K 5%		2S099M-211		
R85	12K 5%		2S099M-165		
R86	470K		2S104-94		
R87	10K	5	340071-5	PW10-10K	
R88	1500Ω	1	2S103S-64	BTA-150Ω	
R89	1Ω	2	2S103S-41		
R90	15K	1	2S103S-76		
R91	6800Ω		2S104-72		
R92	3.9Ω	1	2S103S-3		
R93	270Ω	2	2S103S-55	BTS-270	
R94	680Ω		2S104-60	BTS-680	
R95	120K		2S104-0-1	BTS-120K	

✱ Special temperature compensation resistor.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	SPARTAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ① 1.4A	585VCT ② 230A	5VAC ③ 2A	6.3VAC ③ 2.2A	300071-1	P9733 ①	P-3098 ②			

① Fabricate new mounting.
② Tape 6.3V ③ 4.5A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA							
		SPARTAN PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	366023				A-8295 ✱	FLY-79 ✱		
		366014-1 ①				A-8295 ✱	FLY-79 ✱		
T3	Vert. Output Trans	2S025A-3	Z1806	A-3039	124T1	V312	A-3141	26654	A-104X
T4A	Yoke (90°) Horiz. (Shunt)	380017-2	DF907 ③	MDF-92 ③	235D1 ③	T90F19/45 ③	DY-16A ③	Y-18 ③	T-41-1 ③
B	Vert (45MH)	340017-1 ① 360019-1 ④	DF90T ③	MDF-92 ③	235D1 ③	T90F19/45 ③	DY-16A ③	Y-18 ③	T-41-1 ③
T5A	Width-Series Coil (.3-3.3MH)	380085-3		MWC-10				WC-24	
B	Parallel Coil (4.3-22MH)								

① Alternate Spartan part number.
② Yoke rear cover.
③ Use original yoke damping network.

✱HORIZONTAL-OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	8					8	8	
	5					5	5	
	3					3	3	
	2					2	2	
	1					1	1	
Correct Width Coil Arrow →	2 & 1					2 & 1	2 & 1	
Special Note: →						①		

① If insufficient width, add capacity (50-100MMF ✱ 4KV MINIMUM) across horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	SPARTAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T6	3.5K	3-4Ω	320068-2	21009	A-3618	A-3849	28850	S-53X	

COILS (RF-IF)

ITEM No.	USE	SPARTAN PART No.	NOTES
L1	Ant. Trans.	360490-2	
L2	IF Trap	360601-8	4.7 Microhenries IRC part #CLA

ITEM No.	USE	SPARTAN PART No.	NOTES
L3	RF Choke	360601-9	1 Microhenry
L4	UHF IF Coil	360603-1	
L5	Conv. Plate	360605-1	

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SPARTAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L6	Ant. Video IF	.1Ω	.1Ω	360624-1		TV-131	6325	10
L7	2nd. Video IF	.1Ω	.1Ω	360581-1	17-4622	TV-130	6219	
L8	3rd. Video IF	.1Ω	.1Ω	360582-1	17-5063 ✱	TV-128 ✱	6233 ✱	Includes 47.25MC trap
L9	Shunt Peaking Coil	16Ω		360622-4			6158	460 Microhenries
L10	Series Peaking Coil	7Ω		360622-8	18-3180		6120	150 Microhenries
L11	Shunt Peaking Coil	7.5Ω		360622-9	19-3250	TV-185	6181	235 Microhenries
L12	Shunt Peaking Coil	15Ω		360622-7	18-4400		6186	400 Microhenries
L13	1st. Sound IF	.5Ω		360584-1	20-1004	TV-151	1469	
L14	2nd. Sound IF	.5Ω		360584-1	20-1004	TV-151	1469	
L15	Fil. Choke	.8Ω		360601-3	19-1000		4602	1 Microhenry IRC part #CLA
L16	Discriminator	1.5Ω	1.5ΩCT	360613-1		TV-149	6205	

✱ Use adaptor plate.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SPARTAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L17	53Ω		360579-1	19-1576	TV-163	6210			HS-5	

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ^(-1)	SPARTAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L18	320A	23.5Ω	.9 HY	320068-2		C-5037 ①		C-3338 ①	S6C41 ①	C-17X ①

① Drill one new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SPARTAN PART No.	REPLACEMENT DATA
E1	Vert. Integrator	22K, 8200Ω, 8200Ω, 2900MMF, 500OMMF, 5000MMF	2S018S-1	Aerovox PA-1D Centralab PC-109 Cornell-Dubilier 1B7M1 Erie 1605-01 Sprague V-1

SPARTAN CHASSIS CTA/CMUA473BB, CTA/CMUA474BB, CMUA480BB,CMUA481BB, CTA/475BB, CTA/476BB, CTA/479BB, CTA480BB, CTA481BB (SERIES 116)

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SPARTAN PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1/4A 250V	180157-30		313.250 (3AG - S/B-1/4A)	357001	MDL 1/4	4405

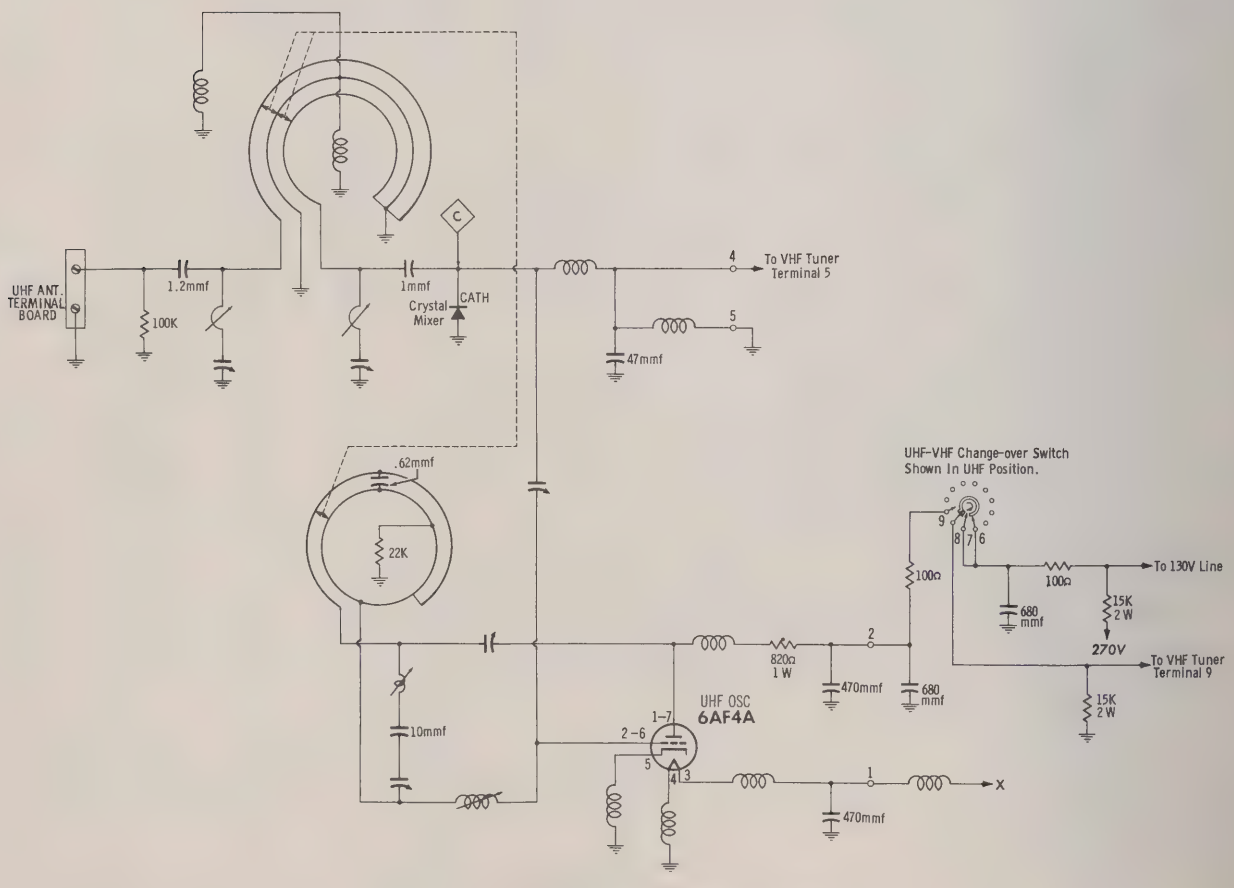
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		SPARTAN PART No.	SYLVANIA PART No.	
M2	1N60 *		1N60	Video Det. (Pigtail)

* Some versions may use crystal diode type 1N64 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	SPARTAN PART No.	NOTES
M3	Dial Light		Not used in some versions
M4	Tuner	700458-3	VHF - Used in all chassis
M5	Tuner	700530-1	UHF - Used in Chassis CMUA475BB, CMUA476BB, CMUA479BB, CMUA480BB, CMUA481BB
M6	Video Det. Assy.	360607-1	Includes M2, coils, R36 and capacitor
M7	Switch	160169-3	Fringe - Local (DPDT-Rotary, wafer type)
M8	Switch	160251-1	Lid interlock - Used in Models CTA481BB and CMUA481BB only
M9	Centering Device	635116-1	
M10	Ion Trap	360492-5	



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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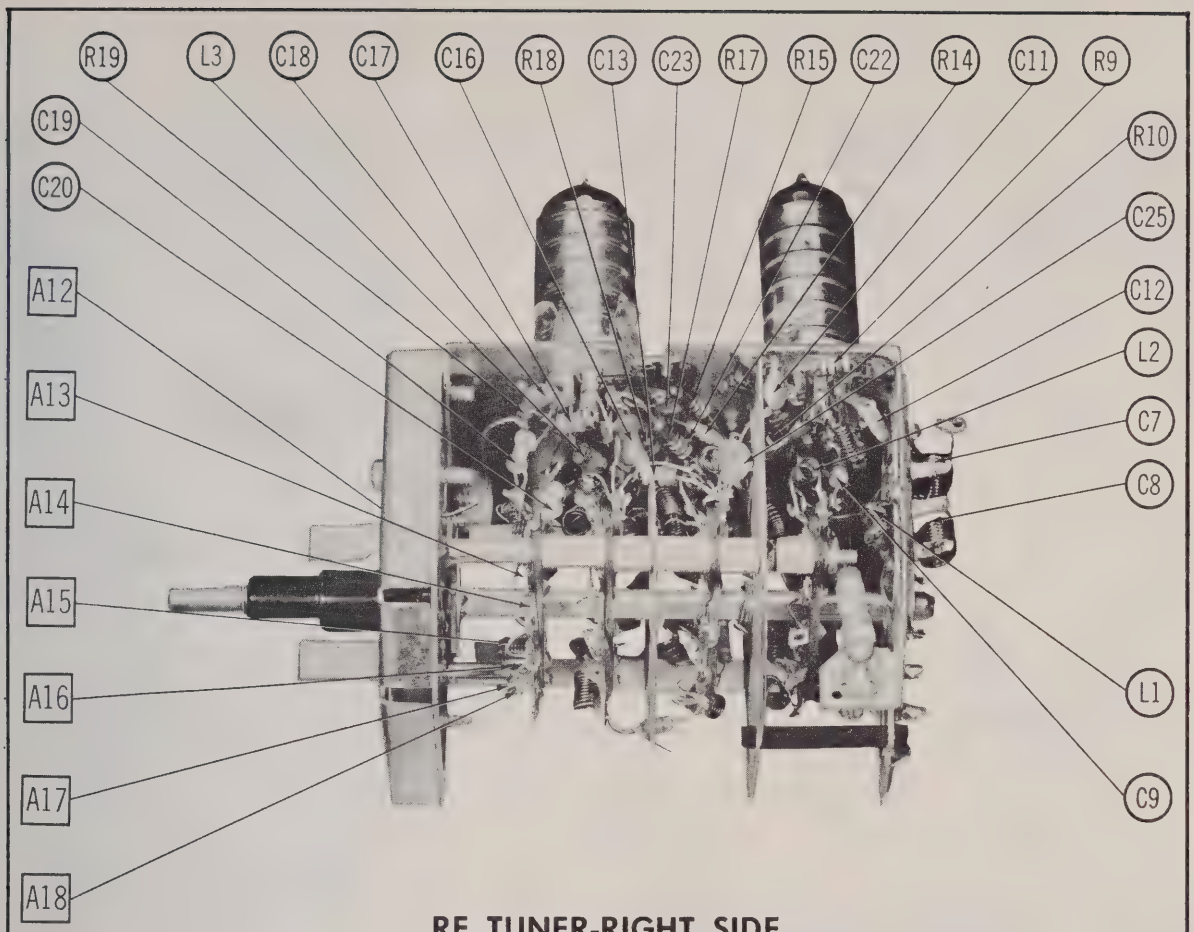
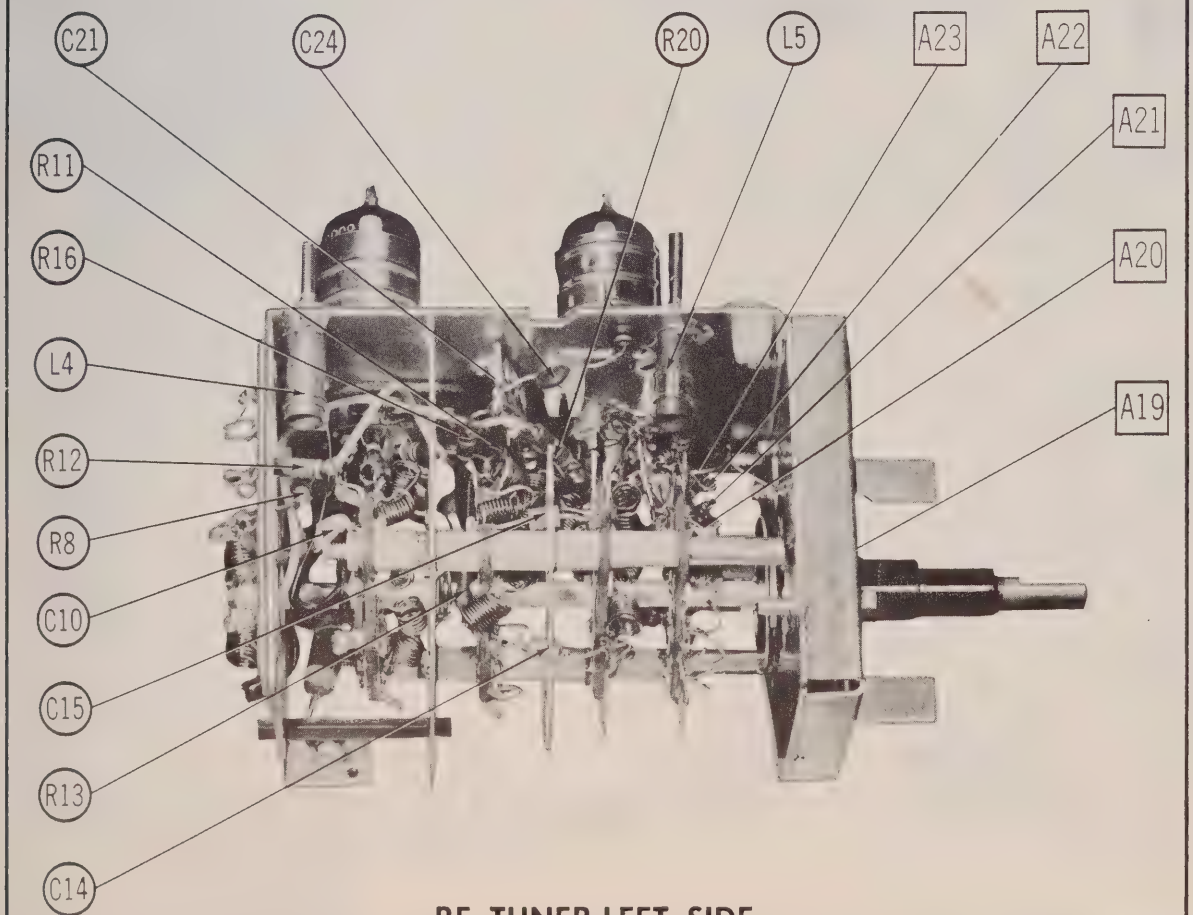
UHF Tuner Part No. 700530-1 Used With UHF Models

UHF TUNER SCHEMATIC



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

STEELMAN MODEL 3AR4

...OF
...RKENSHIP
...E ST.
...COLORADO

STEELMAN
MODEL 3AR4

STEELMAN
MODEL 3AR4

TRADE NAME	Steelman Model 3AR4
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N.Y.
TYPE SET	AC Operated AM Superheterodyne Receiver With 3 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FOR SERVICE INFORMATION ON RECORD CHANGER PART #NM-951 - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET 216 - FOLDER 11 OR RECORD CHANGER MANUAL CM-5.

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PARTS LIST AND DESCRIPTIONS

STEELMAN MODEL 3AR4

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amplifier	12AT6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	CE-1000	PRS150V4040	BBRT44215	TCT3116	TDLT-4	FMT-312	TVA-3448
B	40	150		20					
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C3	220	500		SI220	D6-221	5W5T22	GP2K-221	UC-5322	1FM-322	
C4	200			SI200	D6-201	5W5T2	GP2K-201	MC237	1FM-32	Note 1
C5	.01	600		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C6	220	500		SI220	D6-221	5W5T22	GP2K-221	UC-5322	1FM-322	
C7	.01	600		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C8	.002	600		BPD-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C9	.005	600		BPD-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	Note 2
C10	.01	600		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C11	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

Note 1. Not used in some versions.
Note 2. Some versions may use .01MFD.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½		B-60-S	A47-500K-Z	Q13-133	U48	Volume - Note 1
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch			Not Req.	SWE-12	76-1	US-26	Attach to R1A
R2A	500K	½	VC-25	B-60	A47-500K-Z	Q13-133	U48	Tone - Note 2
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A

Note 1. Some versions may use a 1Meg control, part #VC-61 in this application.
Note 2. Some versions may use an alternate control, part #VC-62 in this application.

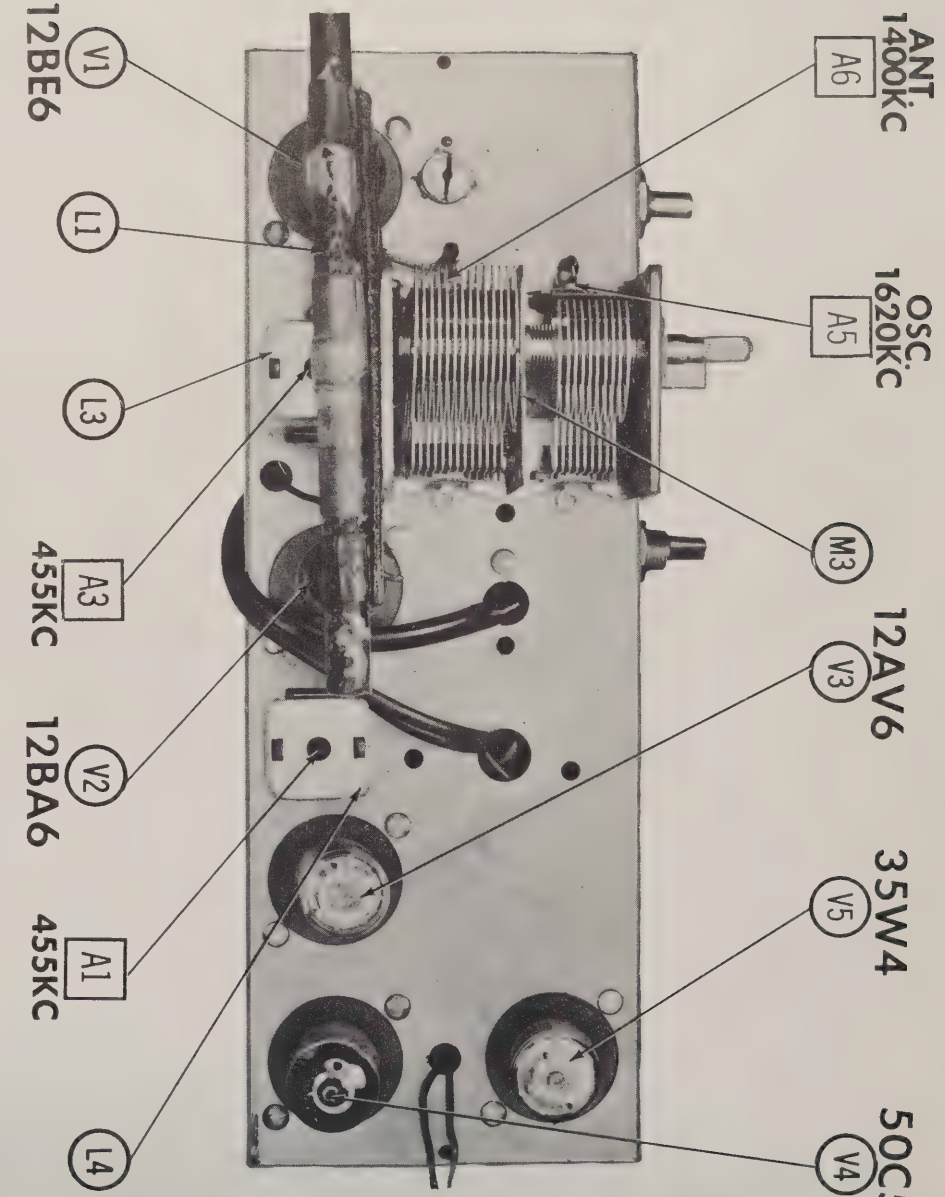
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA STEELMAN PART No.	IRC PART No.	NOTES
R3	22K			BTS-22K	
R4	220Ω			BTS-220	
R5	2.2Meg			BTS-2.2Meg	
R6	1Meg			BTS-1Meg	Note 1
R7	4.7Meg			BTS-4.7Meg	Note 2
R8	220K			BTS-220K	
R9	150Ω			BTS-150	
R10	2200Ω	1		BTA-2200	
R11	330Ω	1		BTA-330	
R12	18Ω			BTS-18	

Note 1. Not used in some versions.
Note 2. Some versions use 10Meg in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	Part of Spkr. SP-100	Z1101	A-3025	A-3332	26S58	S-12X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	STEELMAN PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5"	PM	3-4Ω	SP-100	5A07	20S2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	STEELMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	.4Ω		LPFE-14A				
L2	Osc. Coil	.5Ω	5.3Ω	LC-10			69-OSC.	
L3	Input IF	23Ω	23Ω	IFT-50	16-6758	BC-352	12-C1	
L4	Output IF	23Ω	23Ω	IFT-50	16-6758	BC-353	12-C2	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	STEELMAN PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		55-T	GD-J	47	0-1 or S-1 & 0-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

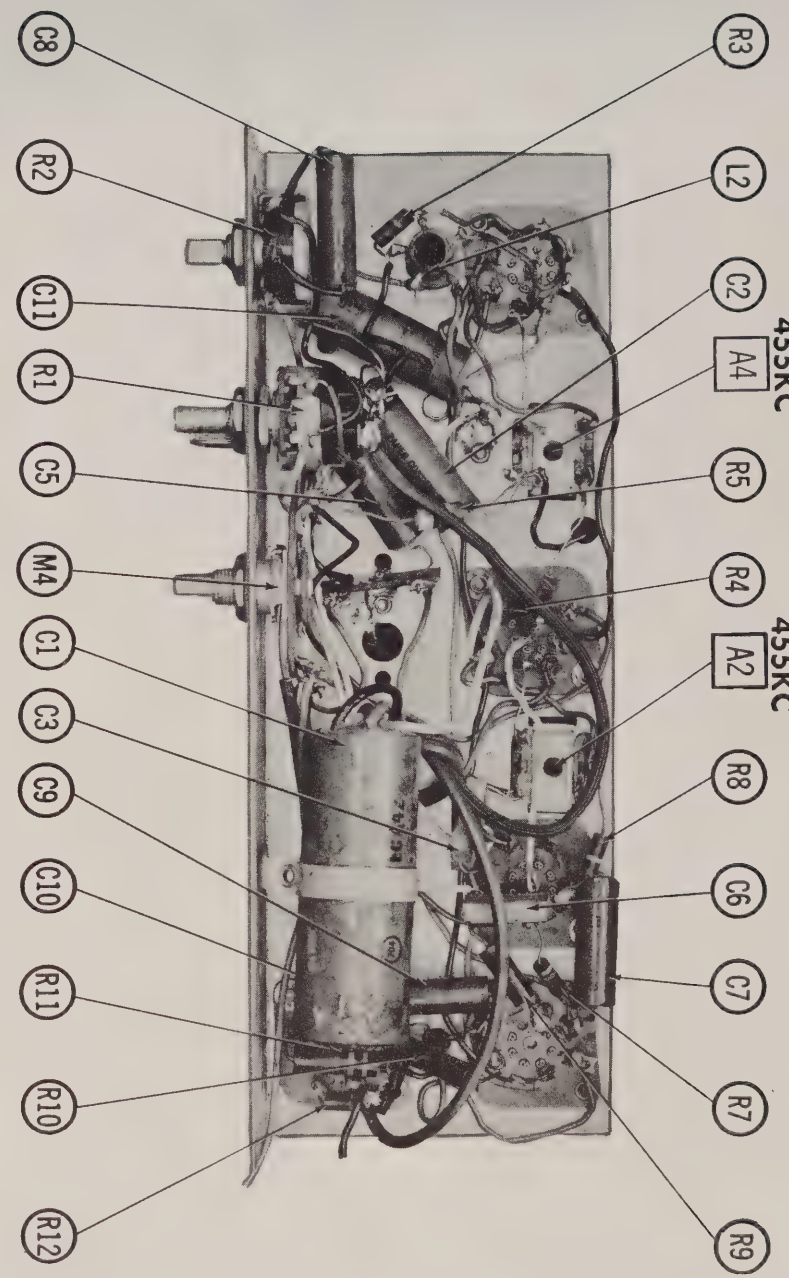
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	STEELMAN PART No.	JENSEN PART No.	WALCO PART No.	
M2		†S-66 or ♦†S-66SD or ♦S-66D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	* Metal † Jewel ♦ Diamond

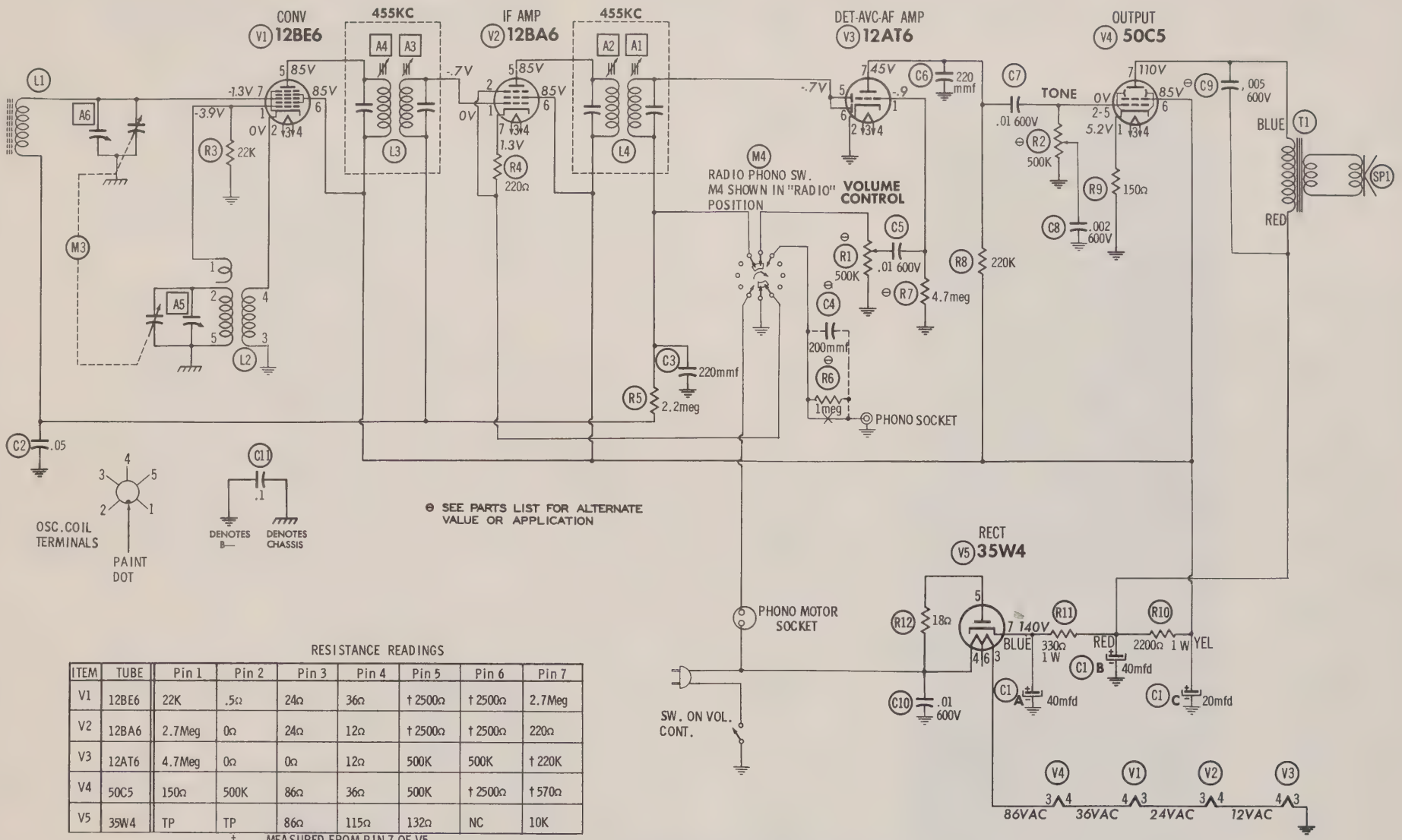
MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M3	Tuning Capacitor	CV-53	2 Gang (39-490MMF, 34-205MMF)
M4	Switch	SW-12	Radio-Phono (2 pole-2 position; rotary, wafer type)

CHASSIS—BOTTOM VIEW



STEELMAN MODEL 3AR4



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.5Ω	24Ω	36Ω	† 2500Ω	† 2500Ω	2.7Meg
V2	12BA6	2.7Meg	0Ω	24Ω	12Ω	† 2500Ω	† 2500Ω	220Ω
V3	12AT6	4.7Meg	0Ω	0Ω	12Ω	500K	500K	† 220K
V4	50C5	150Ω	500K	86Ω	36Ω	500K	† 2500Ω	† 570Ω
V5	35W4	TP	TP	86Ω	115Ω	132Ω	NC	10K

† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.
TP TIP POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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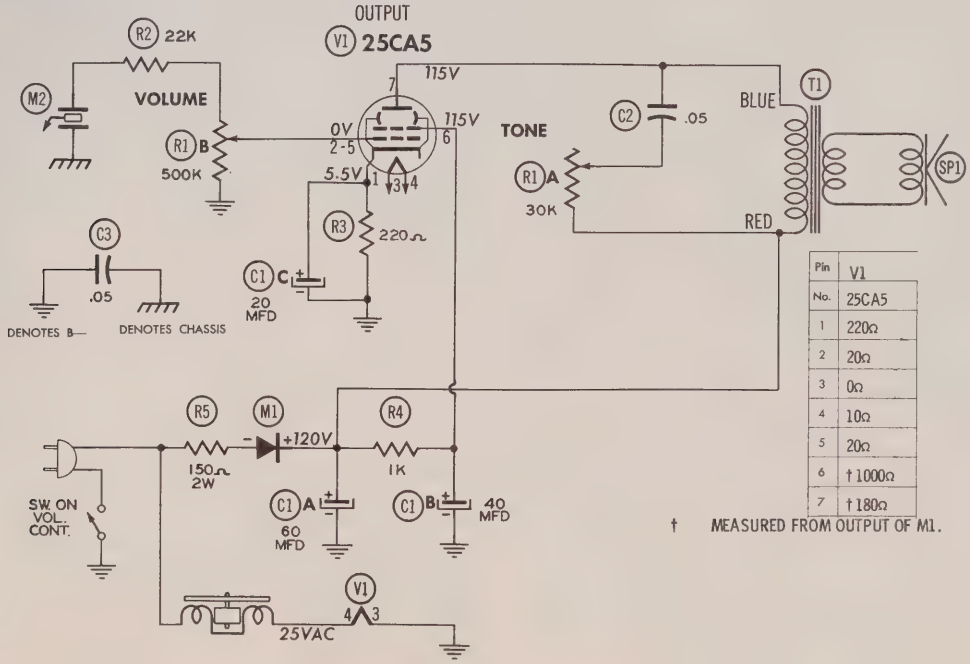
ULTRATONE MODEL 410

L. I. [illegible] WORKENSHIP
3824 MEADE ST.
DENVER, COLORADO

ULTRATONE MODEL 410

ULTRATONE MODEL 410

TRADE NAME	Ultratone Model 410
MANUFACTURER	Audio Industries, Michigan City, Ind.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (One)	Type 25CA5
POWER SUPPLY	105-125 Volts AC - 60 Cycles RATING .33 Amp. @ 117 Volts AC



Pin No.	V1 25CA5
1	220Ω
2	20Ω
3	0Ω
4	10Ω
5	20Ω
6	†1000Ω
7	†180Ω

† MEASURED FROM OUTPUT OF M1.

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340-19

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	25CA5	

ITEM No.	USE	TYPE	NOTES

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ULTRATONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150		PRS150/25V	BBRT5515C	TCT3117	TDLT-7	FMT-333	R2199 *
B	40	150		5050/20					
C	20	25							

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Ultratone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Ultratone PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	30K	1/2		F1-28		QJ-849R♦	UF54L	Tone (Panel)
B	500K	1/2		R2-51			UR55A	Volume (Rear) Att. to R1A
C	Switch			KB-6			US-26T	Attach to R1B

♦ Concentrikit equivalent: Kit K-6, Base elements and shafts; B11-122 & P14-019 (Panel)
B13-133 & R1-028 (Rear)
76-1 (Switch)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Ultratone PART No.	IRC PART No.	NOTES
R2	22K			BTS-22K	
R3	220Ω			BTS-220	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Ultratone PART No.	IRC PART No.	NOTES
R4	1000Ω			BTS-1000	
R5	150Ω	2		PW4-150	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Ultratone PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	3800Ω	4Ω	Part of speaker.	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mtg. hole.

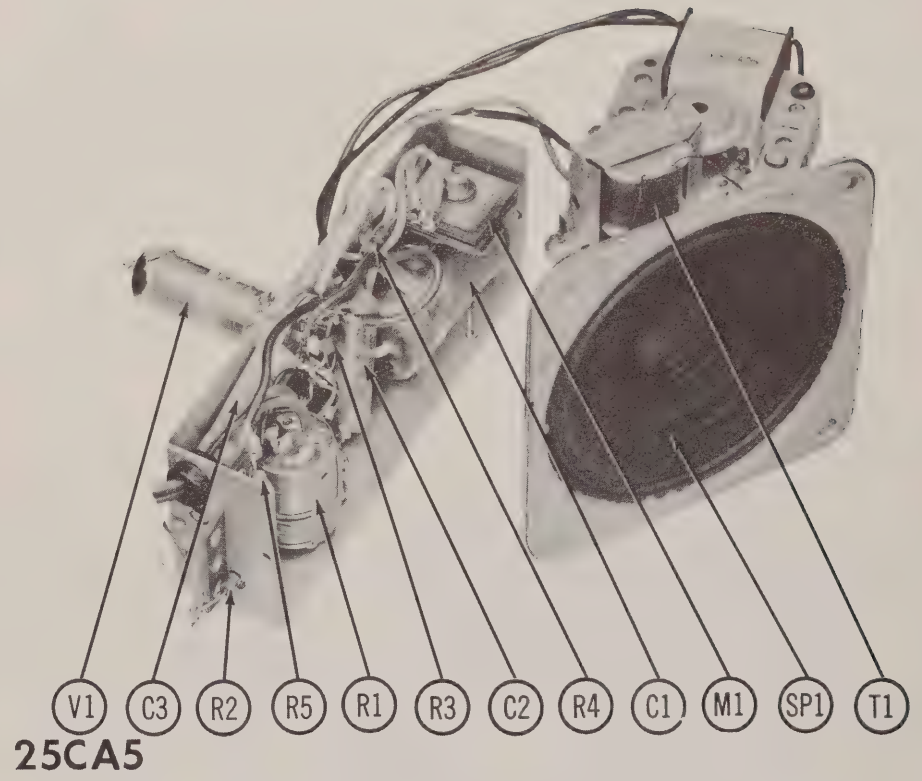
SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA Ultratone PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"	PM	4Ω		4A07	223S1	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Ultratone PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.030ADC		1263A	RS-050	8S35	8J1	50 ①	① Drill new mounting hole.

CHASSIS—BOTTOM VIEW



25CA5

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA Ultratone PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M2		406 *P-66T	K and K-78			*Complete tone arm and cartridge assembly.

ASTATIC NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA Ultratone PART No.	JENSEN PART No.	WALCO PART No.		REMARKS
M3		*W-44 and *W-44LP			* Metal

PHOTOFACT* Folder

*TRADE MARK

WELLS-GARDNER MODELS 321A61C-A-522, -578, 321A61U-A-522, -578, 2321A61C-A-580, 2321A61U-A-580

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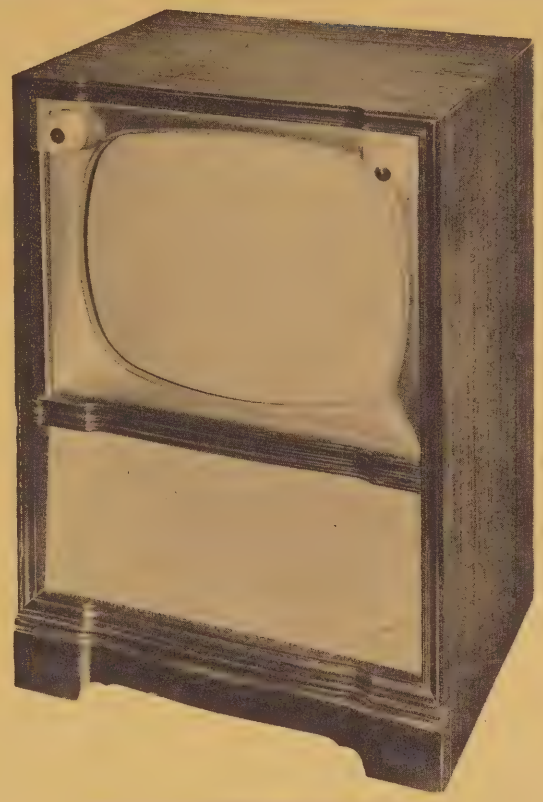

WELLS-GARDNER MODEL 321A61C-A-578

3924 MEADE ST.
DENVER, COLORADO

WELLS-GARDNER MODELS 321A61C-A-522, -578, 321A61U-A-522, -578, 2321A61C-A-580, 2321A61U-A-580

TRADE NAME	Wells-Gardner	MODELS 321A61C-A-522, 321A61C-A-578, 321A61U-A-522, 321AU61-A-578, 2321A61C-A-580, 2321A61U-A-580
MANUFACTURER	Wells-Gardner Co., 2701 N. Kildare Ave., Chicago 39, Illinois	
TYPE SET	Television Receiver	
TUBES	Twenty	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.7 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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PHOTOFACT* Folder
*TRADE MARK

WELLS-GARDNER MODELS 321A61C-A-522, -578, 321A61U-A-522, -578, 2321A61C-A-580, 2321A61U-A-580

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel.

2. Remove 5 wood screws and 1 metal screw. Remove rear cover.

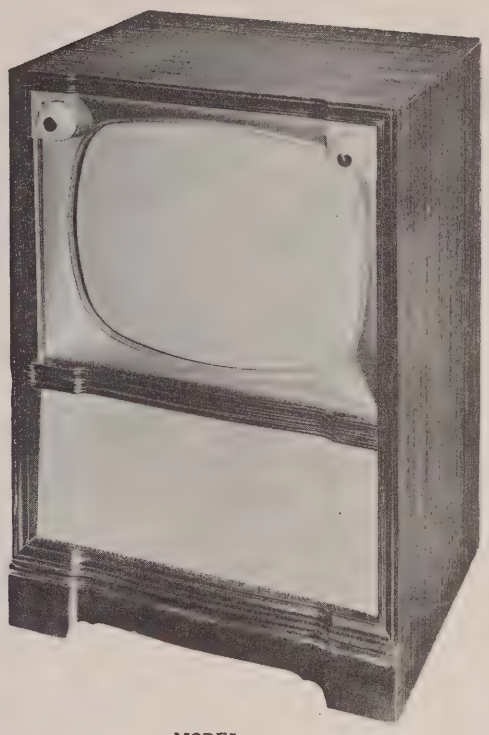
3. Disconnect speaker leads.

4. Remove 2 wood screws holding antenna terminal bracket.

5. Remove 6 chassis mounting board bolts holding chassis mounting board to cabinet, and 2 wood screws from 2 brackets at top of cabinet.

6. Slide chassis with mounting board from cabinet.

7. Remove 4 speed nuts. Remove speaker.



MODEL

321A61C-A-578

WELLS-GARDNER MODELS 321A61C-A-522, -578, 321A61U-A-522, -578, 2321A61C-A-580, 2321A61U-A-580

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 7 push-on type control knobs from front panel of cabinet. Remove 2 metal screws from each cover escutcheon panel. Remove panels and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L27) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the chassis. Adjust the buzz control (R10) for maximum sound and MINIMUM buzz.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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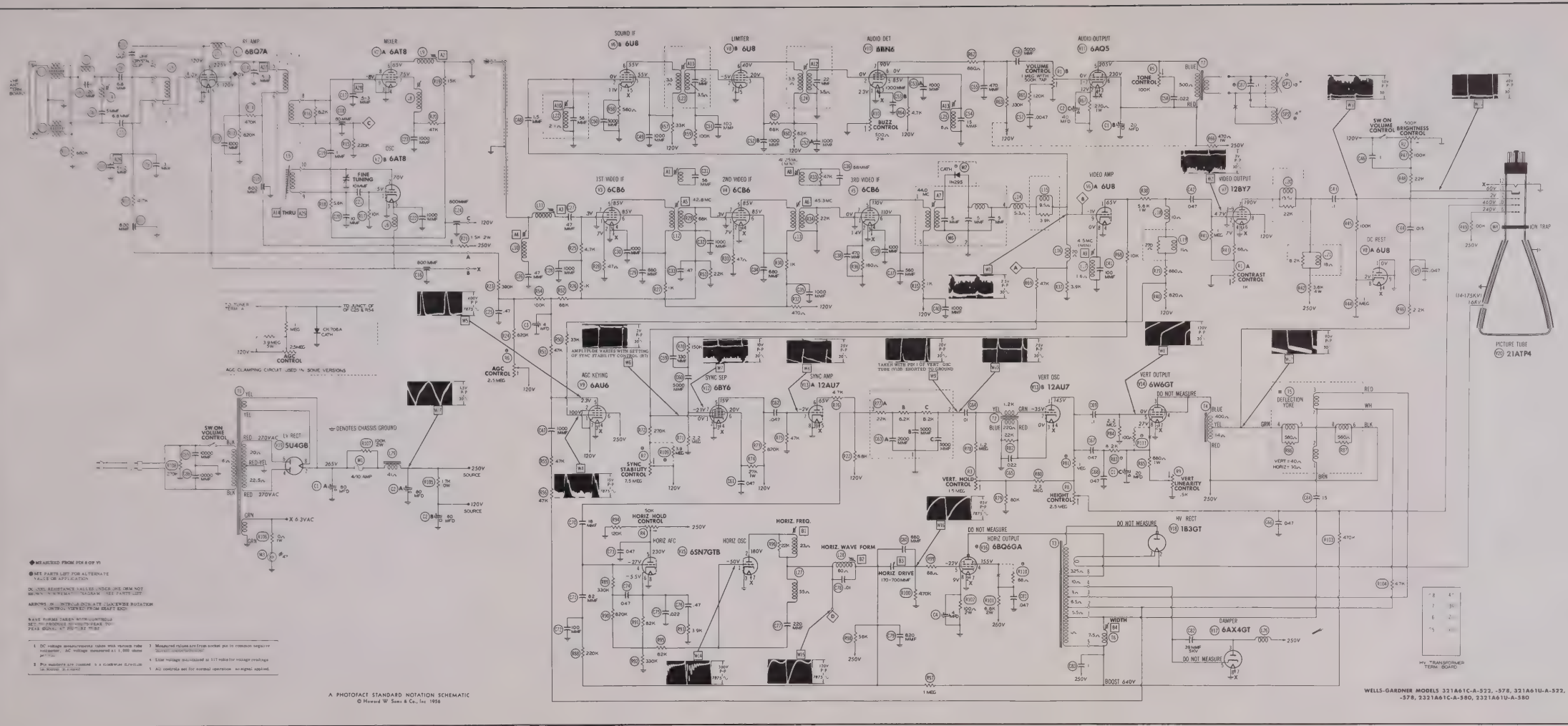
G382

DATE 12-56 SET 340 FOLDER 20



WELLS-GARDNER MODELS 321A61C-A-522, -578, 321A61U-A-522, -578, 2321A61C-A-580, 2321A61U-A-580

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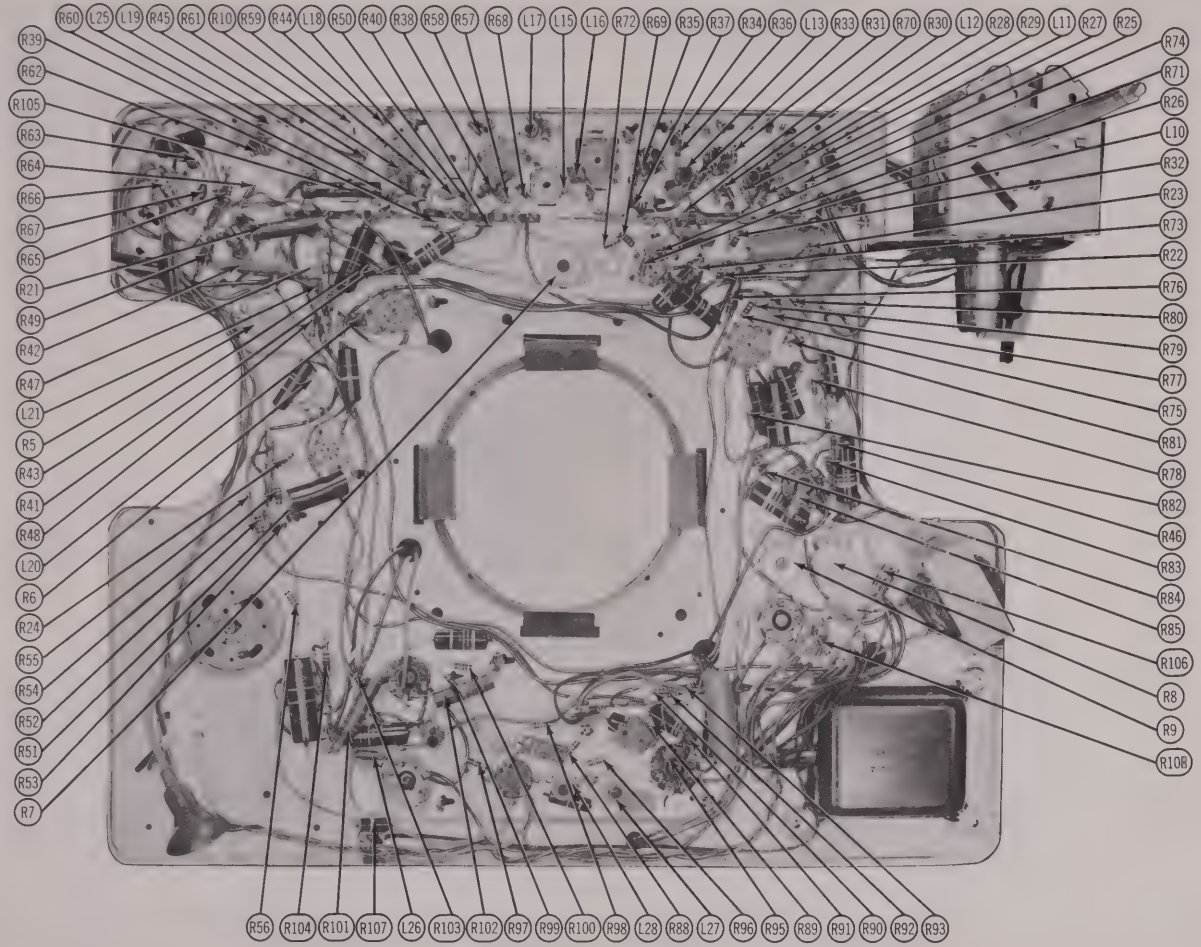
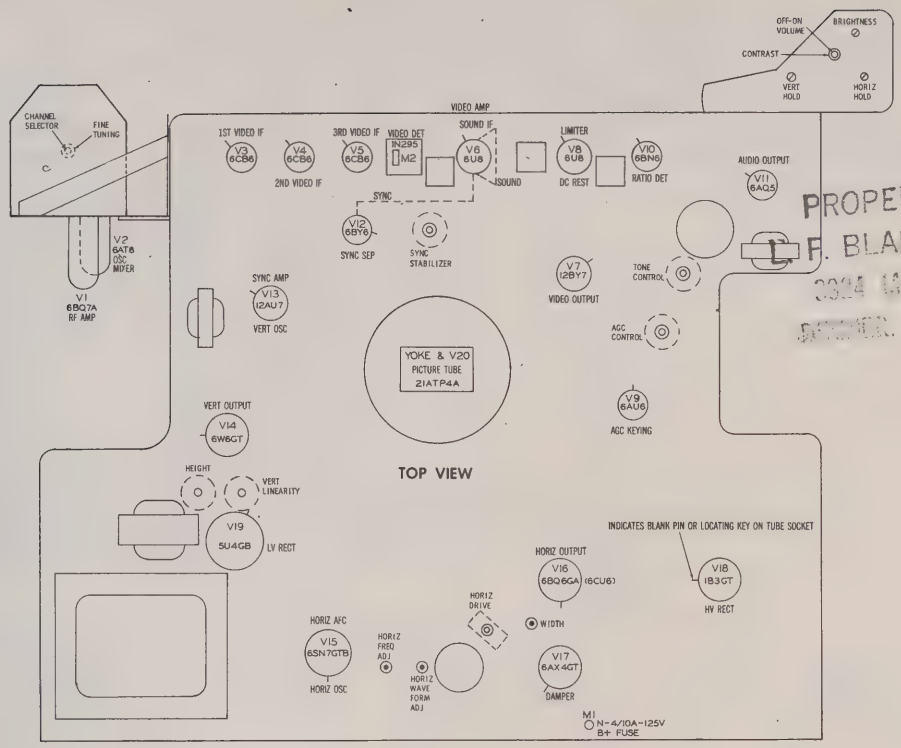


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V19, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V8, V20
Has pic, no sound - V6, V9, V10, V11
Overloaded picture - V8

SYNC FAILURE
No vert. sync - V13
No horiz. sync - V13, V15
No vert. or horiz. sync - V12, V13

SWEEP FAILURE
No raster, has sound - V15, V16, V17, V18, V20
No vertical deflection - V13, V14
Poor vert. linearity or foldover - V13, V14
Poor horiz. linearity or foldover - V15, V16, V17
Narrow picture - V15, V16, V17, V18, V19
Vert. off freq. - V13
Horiz. off freq. - V13, V15

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage leads should be securely taped away from the chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C32. Connect the positive lead to chassis.
Use only enough generator output to provide usable indication on the scope or VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over converter tube (V2).	44MC (10MC Swp.)	41.25MC 45.75MC 47.25MC	Any unused channel	Vert. Amp. thru detector (Fig. 1) to pin 5 of 6CB6 (V3). Low side to chassis.	A1, A2, A3, A4	Adjust A1 to place 47.25MC marker in trap notch as in Fig. 2. Adjust A2, A3, and A4 for response similar to Fig. 2. A2 and A3 affect the flat portion of the curve. A4 positions the 41.25MC marker. Make sure 45.75MC marker is on peak of curve as shown or 44.5MC marker will be incorrect on overall response curve.
2.	"	"	Not used	42.8MC (Unmod.)	"	Use VTVM. DC probe to point (A). Low side to chassis.	A5	Increase bias to 4.5 volts. Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	Not used	45.3MC (Unmod.)	"	"	A6	"
4.	"	"	"	44MC (Unmod.)	"	"	A7	"
5.	"	"	"	41.25MC (Unmod.)	"	"	A8	Adjust for MINIMUM deflection.
6.	"	"	44MC (10MC Swp.)	41.25MC 42.25MC 42.5MC 43.9MC 44.5MC 45.3MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 3. SLIGHTLY retouch A5 thru A8 to obtain desired response. If A1 thru A4 requires retouching, step 1 should be repeated.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	10KΩ	High side thru 10KΩ to point (B). Low side to chassis.	4.5MC (Unmod.)	Any unused channel	DC probe to pin 2 (grid) of picture tube.	A9	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Remove bias supply.
Tune in a TV station and adjust A9 for MINIMUM 4.5MC beat interference in the picture.

SOUND IF ALIGNMENT

Turn the set on and tune in a TV station. Reduce the signal input by use of an attenuator or similar device until hiss and background noise is noticed.
Adjust A10, A11, A12, A13 and R10 for maximum undistorted sound and MINIMUM buzz.
If hiss disappears during alignment, reduce signal until hiss reappears.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 4.5 volt battery to the unground side of C32. Connect the positive lead to chassis.
The channel oscillator adjustment screws are reached through a hole below and slightly to the right of the channel switch shaft. The correct adjustment screw is accessible though this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across VHF antenna leads with 120Ω in each lead.	213MC (10MC Swp.)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should be at 50%.
			207MC (10MC Swp.)	205.25MC 209.75MC	12		A15	
			201MC (10MC Swp.)	199.25MC 203.75MC	11		A16	
			195MC (10MC Swp.)	193.25MC 197.75MC	10		A17	
			189MC (10MC Swp.)	187.25MC 191.75MC	9		A18	
			183MC (10MC Swp.)	181.25MC 185.75MC	8		A19	
			177MC (10MC Swp.)	175.25MC 179.75MC	7		A20	
			85MC (10MC Swp.)	83.25MC 87.75MC	6		A21	
			79MC (10MC Swp.)	77.25MC 81.75MC	5		A22	
			69MC (10MC Swp.)	67.25MC 71.75MC	4		A23	
			63MC (10MC Swp.)	61.25MC 65.75MC	3		A24	
			57MC (10MC Swp.)	55.25MC 59.75MC	2		A25	

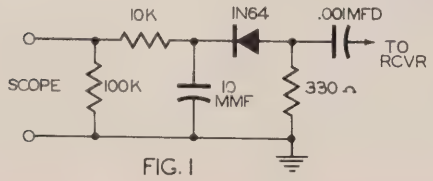


FIG. 1

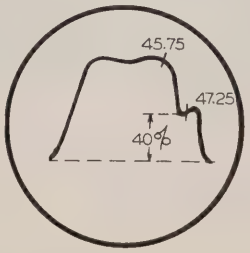


FIG. 2

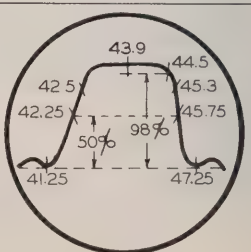


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C25. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	205. 25MC 209. 75MC	12	Vert. amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A26, A27, A28	Adjust for response curve similar to Fig. 5 with markers above 90%.
10.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	"		If markers fall below 70% on any channel, make compromise adjustment of A26, A27, and A28 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

UHF TUNER ALIGNMENT

The UHF tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

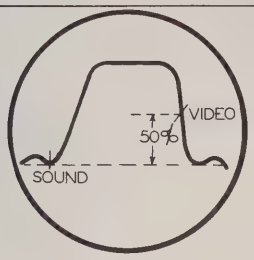


FIG. 4

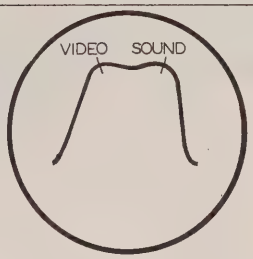
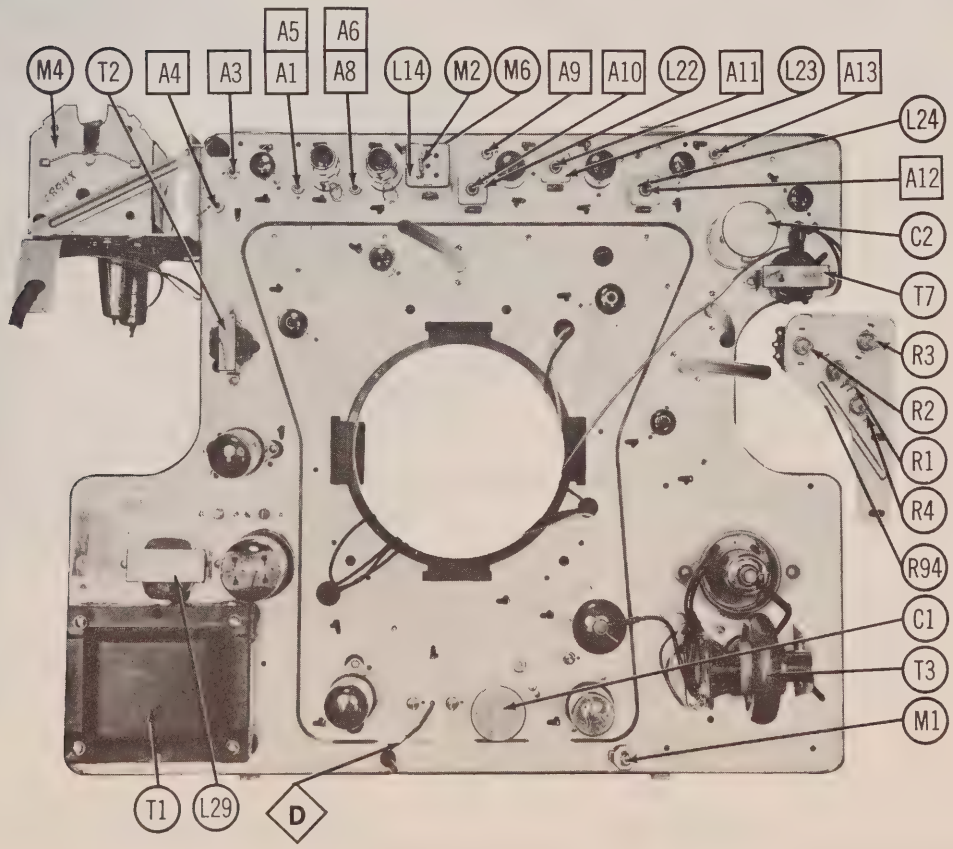


FIG. 5

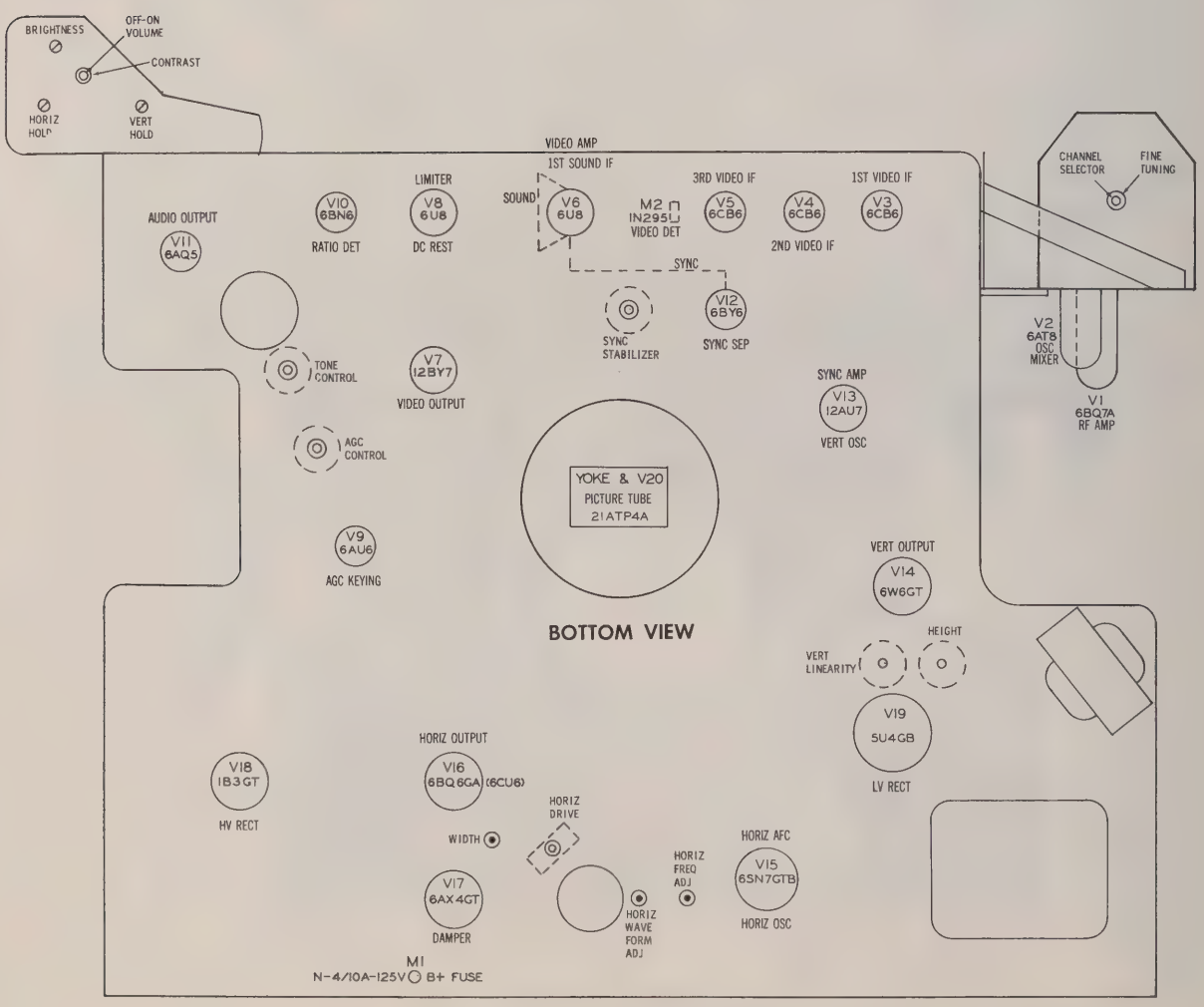


CHASSIS TOP VIEW

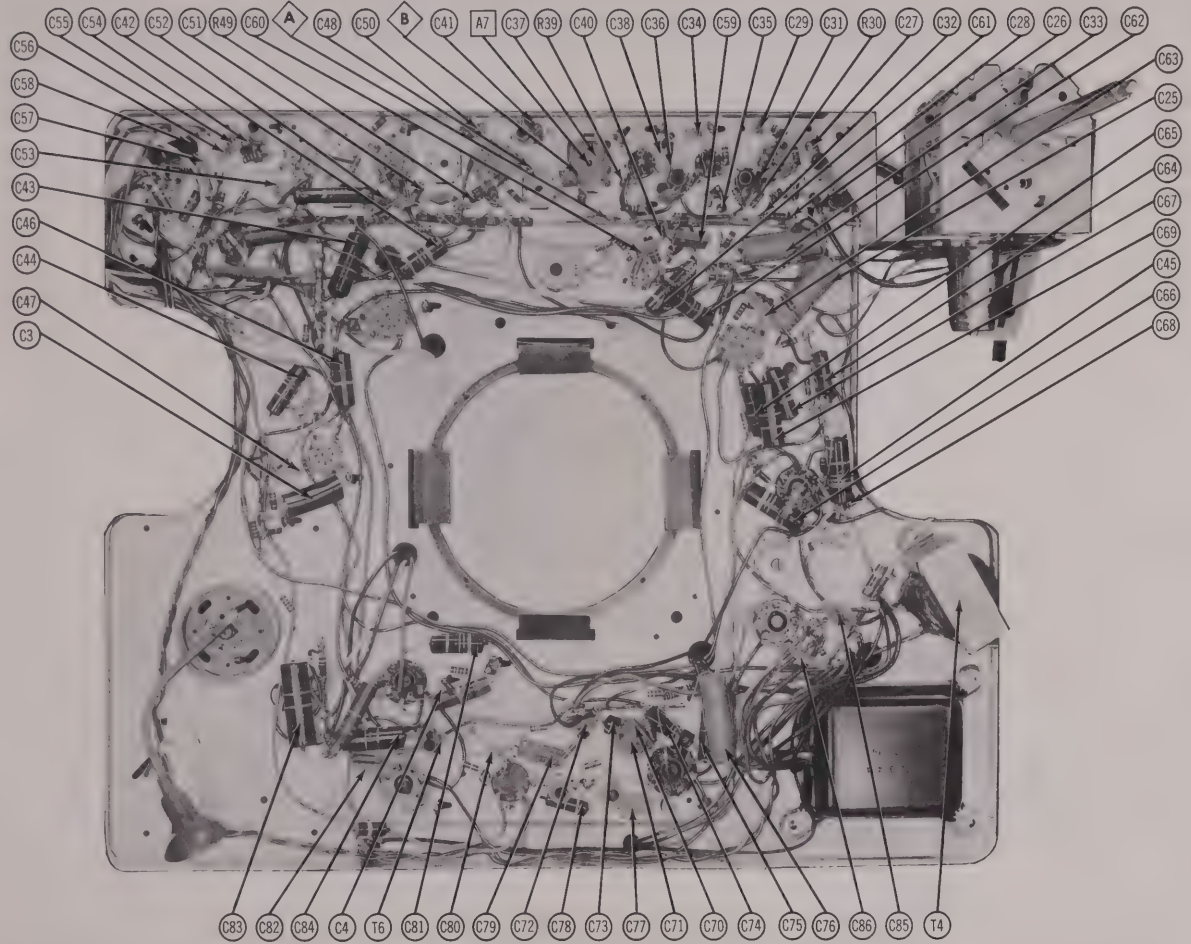
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	550KΩ	0Ω	0Ω	.1Ω	† 1.5KΩ	300KΩ	INF	0Ω
V 2	6AT8	10KΩ	† 7.3KΩ	0Ω	0Ω	.1Ω	† 17KΩ	† 50KΩ	0Ω	220KΩ
V 3	6CB6	30KΩ	47Ω	0Ω	.1Ω	† 3.2KΩ	† 3.2KΩ	0Ω		
V 4	6CB6	22KΩ	47Ω	0Ω	.1Ω	† 3.2KΩ	† 3.2KΩ	0Ω		
V 5	6CB6	.2Ω	180Ω	0Ω	.1Ω	† 2.7KΩ	† 2.7KΩ	0Ω		
V 6	6U8	† 9KΩ	2.1Ω	† 35KΩ	0Ω	.1Ω	† 35KΩ	560Ω	1.6Ω	3.9KΩ
V 7	12BY7	400Ω	1Meg	0Ω	0Ω	0Ω	.1Ω	† 3.6KΩ	† 1.7KΩ	0Ω
V 8	6U8	0Ω	100KΩ	† 150KΩ	.1Ω	0Ω	† 85KΩ	0Ω	1Meg	0Ω
V 9	6AU6	† 35KΩ	† 1.7KΩ	0Ω	.1Ω	120KΩ	† 45Ω	† 1.7KΩ		
V 10	6BN6	300Ω	3.5Ω	.1Ω	0Ω	† 6.5KΩ	6Ω	† 330KΩ		
V 11	6AQ5	500KΩ	270Ω	.1Ω	0Ω	† 1KΩ	† 500Ω	500KΩ		
V 12	6BY6	50KΩ	0Ω	0Ω	.1Ω	† 820KΩ	† 30KΩ	2.2Meg		
V 13	12AU7	▲ 1.7Meg	2Meg	220Ω	.1Ω	.1Ω	† 13KΩ	47KΩ	0Ω	0Ω
V 14	6W6GT	TP	0Ω	† 450Ω	† 450Ω	2.2Meg	NC	.1Ω	1KΩ	
V 15	6SN7GTB	400KΩ	† 56KΩ	0Ω	1.5Meg	† 10KΩ	400KΩ	.1Ω	0Ω	
V 16	6BQ6GA	TP	0Ω	NC	† 6.8KΩ	470KΩ	NC	.1Ω	100Ω	TOP CAP ▲ 10Ω
V 17	6AX4GT	NC	NC	750KΩ	NC	† 45Ω	NC	.1Ω	0Ω	
V 18	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 335Ω
V 19	5U4GB	NC	30KΩ	NC	23Ω	NC	20Ω	NC	30KΩ	
V 20	21ATP4A	0Ω	1Meg	PIN 6 † 100KΩ	PIN 10 ▲ 420KΩ	PIN 11 † 250KΩ	PIN 12 .1Ω			

† MEASURED FROM PIN 2 OF V19.
▲ MEASURED FROM PIN 3 OF V17.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BQ7A	
V2	Mixer-Oscillator	6AT8	
V3	1st. Video IF Amplifier	6CB6	
V4	2nd. Video IF Amplifier	6CB6	
V5	3rd. Video IF Amplifier	6CB6	
V6	Video Amplifier-Sound IF Amplifier	6U8	
V7	Video Output	12BY7	
V8	DC Restorer-Limiter	6U8	
V9	AGC Keying	6AU6	
V10	Audio Detector	6BN6	
V11	Audio Output	6AQ5	
V12	Sync Separator	6BY6	
V13	Sync Amplifier-Vert. Osc.	12AU7	
V14	Vert. Output	6W6GT	
V15	Horiz. AFC-Horiz. Osc.	6SN7GTB	
V16	Horiz. Output	6BQ6GA	Note 1
V17	Damper	6AX4GT	
V18	HV Rectifier	1B3GT	
V19	LV Rectifier	5U4GB	

Note 1. A 6CU6 may be used in some versions.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	Wells-Gardner PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V20	21ATP4 ①	21ATP4 ①	21ATP4 ①	21ATP4/ 21ATP4A②	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Wells-Gardner PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲80	300	45X428	AFH4-07	B068	FP235	TMD-79	D-390	R2203 *
B	■20	300			BR205	TC36	TD-25-50	FM-0525	
C	▲20	50							
C2A	▲80	300	45X429	AFH3-29-50	B081	FP229.4	TMD-33	D-175	R2204 *
B	■60	300			BR505	TC39	TD-50-50	FM-0550	
C	▲40	50							
C3	4	50	47X418	PRS150V4	BR550	TC30	TD-4-50	MMT-0505	TVA-1303
C4	4	50	47X418	PRS150V4	BR550	TC30	TD-4-50	MMT-0505	TVA-1303

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Wells-Gardner PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	120		13L8V121K		D6-121		811-121			
C6	5		13L8C050D	NP0-DI5	TCZ-5	Z011	NP0A-050	ZT-555	5TCCB-V47	
C7	6.8		13L8C6R81	NP0-DI6.8	TCZ-6.8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C8	6.8		13L8C6R81	NP0-DI6.8	TCZ-6.8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C9	3			NP0-DI3	TCZ-3R3	Z007	NP0A-030	ZT-553	5TCCB-V33	
C10	5-15		31B-901-02							
C11	800		13M-320EA-102ZC							
C12	2.2		13L8GP2R2C	NP0-SI2.2	TCZ-2R2	Z006	NP0A-2R2		5TCCB-V22	
C13	1000		13L8X102Z	BPD-001	DD-102	K069	811-102	DC-521	5HK-D1	
C14	.5-3		31B-902		829-3		3115-01-0R5	CT565A		
C15	800		13M-320EA-102ZC							
C16	800		13M-320EA-102ZC							
C17	.5-3		31B-902		829-3		3115-01-0R5	CT565A		
C18	60		13M-320Q-600J							
C19	1		13D-111-20	NP0-SI1	TCZ-1		NP0A-010		5TCCB-V1	
C20	10		13L8UA100D							
C21	10		13L8Q100A							
C22	1000		13L8X102Z	BPD-001	DD-102	K069	811-102	DC-521	5HK-D1	
C23	1000		13L8X102Z	BPD-001	DD-102	K069	811-102	DC-521	5HK-D1	
C24	800		13M-320EA-102ZC							
C25	.47	200	RCP10M2474M	P288N-47		CUB2P47		PT4047	2TM-P47	
C26	47			NP0-SI47	TCZ-47	TZ22	831-470	ZT-5447	MS-447	
C27	47			NP0-SI47	TCZ-47	TZ22	831-470	ZT-5447	MS-447	
C28	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C29	680			BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C30	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C31	56			NP0-SI56	TCZ-56	TZ24	NP0-337-560			
C32	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	.47	200	RCP10M2474M	P288N-47		CUB2P47		PT4047	2TM-P47	
C34	680			BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C35	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C36	68			NP0-SI68	TCZ-68	TZ26	NP0-337-680		5TCC-Q68	
C37	560		80X9	1464-00056	D6-681	1R5T56	NP0-337-680		MS-356	
C38	470		80X4	1464-00047	DD-471	5R5T47	811-471	UC-5347	1FM-347	
C39	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C40	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C41	100			NP0-SI100	TCZ-100	TZ30	801-101	ZT-531	5TCC-T1	
C42	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C43	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C44	.015	600	RCP10M6153M	P688N-15	DD16-153	CUB6S15		PT6115	6TM-S15	
C45	.047	600		BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C46	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C47	1000		47X753	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C48	1.5			NP0-SI1.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C49	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C50	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C51	100			NP0-SI100	D6-101	TZ30	801-101	ZT-531	5TCC-T1	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA CORONADO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C52A	1000		80X5	BPD-3X001	DD3-102	DK069	81J-001	DCD521	5HX-J21	
B	1000									
C53A	1000		80X3	BPD-2X001	DD3-152	DK069	81J-001	DCD521	5HX-J21	
B	1000									
C54	15									
C55	470		80X4	BPD-00047	DD-471	K060	81J-471	UC-5247	5GA-T47	
C56	5000			BPD-005	DD-502	K060	81J-005	DC-525	5HX-D5	
C57	.0047	600	RCP10M4472M	BPD-0047	DD-472	CUBD47	GPS-333-472	DT6247	6TM-D47	
C58	.033	600	RCP10M3233M	BPD-03	DP-303	CUBH33	81T-03	DT6233	6TM-S33	
C59	330	500	47X570	1469-00033		SR5T33			M8-333	
C60	5000			BPD-005	DD-502	K060	81J-006	DC-526	5HX-D5	
C61	.047	400	RCP10M4473M	BPD-05	DP-503	CUBH47		DT6147	4TM-S47	
C62	.047	400	RCP10M4473M	BPD-06	DP-503	CUBH47		DT6147	4TM-S47	
C63A	3000		†76X7	†PAU10	†PC-100	†U2TM5	†149B-01	DC-523	†V1	
B	3000							DC-535		
C	3000							DC-538		
C64	.01	400		BPD-01	DP-103	CUBH01	GPS-333-103	DT6111	4TM-S1	
C65	.022	200	RCP10M2223M	BPD-03	DP-303	CUBH03	81T-03	DT6123	2TM-S23	
C66	.047	600	RCP10M6473M	BPD-05	DP-503	CUBH47		DT6147	6TM-S47	
C67	.047	400	RCP10M4473M	BPD-05	DP-503	CUBH47		DT6147	4TM-S47	
C68	.047	200	RCP10M2473M	BPD-05	DP-503	CUBH47		DT6147	2TM-S47	
C69	1	400		P468N-1	DP-104	CUB4P1		PT601	4TM-P1	
C70	18	500		1469-00018	TCE-18	23B5Q18	NP0E-180		M8-418	
C71	82	500	RCM2G820K	1469-00082	TCE-82	23B5Q82	NP0-337-820		M8-482	
C72	100	500		1469-0001	TCE-100	23B5Z1	NP0-337-101	MC B235	M8-31	
C73	.047	400	RCP10M4473M	BPD-05	DP-503	CUBH47		DT6147	4TM-S47	
C74	.047	200	RCP10M4473M	BPD-05	DP-503	CUBH47		DT6147	2TM-S47	
C75	.022	200	RCP10M2223M	BPD-03	DP-303	CUBH03	81T-03	DT6123	2TM-S23	
C76	47	300	RCP10M2474M	P268N-47		CUBZP47			DT6147	2TM-P47
C77	220	500		1469-00023	TCE-220	23B5T23	NP0-335-221		M8-322	
C78	01	400		BPD-01	DD-103	CUBH01	GPS-333-103	PT611	4TM-S1	
C79	820	500	RCM3B821K	1464-00008		1R5T823			M8-382	
C80	680			1464-00008	DD-681	K063	81J-681	UC-5386	M8-368	
C81	.047	400	RCP10M4473M	BPD-05	DP-503	CUBH47		DT6147	4TM-S47	
C82	39	1000	47X756		DD60-390					
C83	1	600		P468N-1	DP-104	CUB6S1		PT601	6TM-P1	
C84	15	200	RCP10M2154M	P268N-15		CUB2P15		DT6105	2TM-P15	
C85	10000		47X615	BPD-01	DD-103	K082	81J-01	DC-511	5HX-S1	
C86	10000			BPD-01	DD-103	K082	81J-01	DC-511	5HX-S1	
C87	1	600		P468N-1	DP-104	CUB6P1		PT601	6TM-P1	Note 1

† Items C63A, C63B, C63C, R77A and R77C are combined in one unit.
Note 1 Not used in some versions

CONTROLS

ITEM No.	RATING RESIST ANCE	RATING WATTS	REPLACEMENT DATA Wells-Gardner PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω		B78X24A	F1-4	RTV-579	* Q2-873	UF15L	Contrast (Panel)
B	1Meg			R1-56			UR16-735 †	Volume tagged at 500 KΩ (Rear)
C	Switch			KD-2			US-37	Attach to R1B.
R2A	500KΩ	1	B40X394C	AB-51	A47-500K-S	QU1-153	U-50	Brightness
B	Shaft		Not Req.	AK-8	R3-516	NQ	D6-37	Attach to R2A.
R3A	1.5Meg	1	B40X396C	AB-763	A47-1.5Meg-S	QU1-158	U-158	Vert. Hold
B	Shaft		Not Req.	AK-2	R3-358	NQ	D6-37	Attach to R3A.
R4A	50KΩ	1	B40X395C	AB-31	A47-50K-S	QU1-133	U-30	Horizontal Hold
B	Shaft		Not Req.	AK-2	R3-358	NQ	D6-37	Attach to R4A.
R5A	100KΩ	1	B40X407	AB-40	A47-100K-S	QU1-138	TA5EL	Tone
B	Shaft		Not Req.	AK-4	FS3-3	Not Req.	Not Req.	Attach to R5A.
R6A	2.5Meg	1	B40X405	AB-33	A47-2.5Meg-S	QU1-329	TA3SL	Focus-Note 1
B	Shaft		Not Req.	AK-19	R3-3	Not Req.	Not Req.	Attach to R6A.
R7A	5Meg	1	B40X406	AB-49	A47-5Meg-S	QU1-143	PTA5SL	Sync Stability-Note 3
B	Shaft		Not Req.	AK-19	R3-3	Not Req.	Not Req.	Attach to R7A.
R8A	2.5Meg	1	B40X405A	AB-33	A47-2.5Meg-S	QU1-329	TA3SL	Height
B	Shaft		Not Req.	AK-4	FS3-3	RQ	Not Req.	Attach to R8A.
R9A	150Ω	1	B40X410	AB-5	A47-150-S	QU1-108	PTA15L	Vert. Linearity
B	Shaft		Not Req.	AK-19	R3-3	Not Req.	Not Req.	Attach to R9A.
R10	500Ω	2	40X397		39-500			Buzz-Wire Wound

Note 1 Later production receivers will use an alternate control Part No. 40X405 in this application.
Note 2 Later production receivers will use an alternate control Part No. 40X410 in this application.
† Universal Replacement (Walsco) Exact Duplicate Part No. UE75L).
● Various rating control Part No. 40X410 for replacement remove the 3.9 megohm resistor connected from high side to arm of control.
● Various rating control Part No. 40X405 for replacement remove the 3.9 megohm resistor (R109) used with the old control.
● Concentrator Equivalent: K-3 Kit, Base Elements and Shafts; BU-108 & P6-200 (Panel)
B13-137X & R1-318 (Rear)
T6-2 (Switch)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Wells-Gardner PART No.	IRC PART No.	NOTES
R11	680KΩ	1	12TA5684M	BTS-680K	
R12	470Ω	1	12TA472K	BTS-470	
R13	620KΩ	1	12TA624K	BTS-620K	
R14	470KΩ	1	12TA474K	BTS-470K	
R15	220KΩ	1	12TA224M	BTS-220K	
R16	820KΩ	1	12TA823K		
R17	10KΩ	1	12TA103K		
R18	560KΩ	1	12TA563K		
R19	15KΩ	1	12TA153K		
R20	47KΩ	1	12TA473K		
R21	150Ω	1		BTS-150	
R22	6800Ω	1		BTS-6800	
R23	3900Ω	1		BTS-390E	
R24	620KΩ	1		BTS-620K	
R25	4700Ω	1			
R26	1000Ω	1		BTS-1000	
R27	100Ω	1		BTS-100	
R28	10KΩ 5%	1		BTS-47	
R29	68KΩ	1			
R30	1000Ω	1		BTS-1000	
R31	47Ω 5%	1		BTS-47	
R32	47Ω	1		BTS-470	
R33	47KΩ	1			
R34	22KΩ	1			
R35	1000Ω	1		BTS-1000	
R36	180Ω	1		BTS-180	
R37	7300Ω 5%	1		BTS-3300	
R38	5600Ω	1		BTS-5600	
R39	68Ω	1		BTS-68Ω	
R40	820Ω	1		BTS-820	
R41	1Meg	1		BTS-1Meg	
R42	12000Ω	1	43X331		

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Wells-Gardner PART No.	IRC PART No.	NOTES
R43	68Ω	1		BTS-68	
R44	1Meg	1		BTS-1Meg	
R45	100KΩ	1		BTS-100K	
R46	2200Ω	1		BTS-2200	
R47	100KΩ	1		BTS-100K	
R48	330Ω	1		BTS-33E	
R49	100KΩ	1		BTS-100K	
R50	33KΩ	1		BTS-33K	
R51	47KΩ	1		BTS-47K	
R52	68KΩ	1		BTS-68K	
R53	22KΩ	1		BTS-22K	
R54	100KΩ	1		BTS-100K	
R55	47KΩ	1		BTS-47K	
R56	47KΩ	1		BTS-47K	
R57	33KΩ	1		BTS-33K	
R58	5600Ω	1		BTS-560	
R59	100KΩ	1		BTS-100K	
R60	82KΩ	1		BTS-82K	
R61	68KΩ	1		BTS-68K	
R62	560Ω	1		BTS-560	
R63	330KΩ	1		BTS-330K	
R64	4700Ω	1		BTS-4700	
R65	120KΩ	1		BTS-120K	
R66	470Ω	1		BTA-470	
R67	270Ω	1		BTA-270	
R68	10KΩ	1		BTS-10K	
R69	47KΩ	1		BTS-47K	
R70	150KΩ	1		BTS-150K	
R71	2.2Meg	1		BTS-2.2Meg	
R72	270KΩ	1		BTS-270K	
R73	820KΩ	1		BTS-820K	
R74	27KΩ	1		BTA-27K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Wells-Gardner PART No.	IRC PART No.	NOTES
R75	47KΩ			BTS-47K	
R76	4700Ω			BTS-4700	
R77A	22KΩ			BTS-22K	
B	8200		† 76X7	BTS-8200	
C	8200			BTS-8200	
R78	1.2Meg			BTS-1.2Meg	
R79	180KΩ			BTS-180K	
R80	2.2Meg			BTS-2.2Meg	
R81	1Meg			BTS-1Meg	Note 1
R82	22KΩ			BTS-22K	
R83	8200Ω			BTS-8200	Note 2
R84	2.2Meg			BTS-2.2Meg	
R85	680Ω			BTS-680	
R86	56KΩ				
R87	56KΩ			DC-538	† V1
R88	220KΩ				
R89	330KΩ				
R90	820KΩ				
R91	82KΩ				
R92	390KΩ				

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Wells-Gardner PART No.	IRC PART No.	NOTES
R93	390Ω				
R94	120KΩ				
R95	82KΩ				
R96	22KΩ				
R97	1Meg			BTS-1Meg	
R98	56KΩ			BTS-56K	
R99	10Ω				
R100	470KΩ				
R101	680Ω	2			
R102	100Ω	2			
R103	470KΩ	1		BTS-470K	
R104	470Ω	1			
R105	1700Ω	10	43X396	1.5AA-1700	
R106	10Ω	1		BTA-10	
R107	100KΩ	3		BTS-100K	
R108	270KΩ	3		BTS-270K	
R109	3.9Meg	1		BTS-3.9Meg	Note 3
R110	68Ω				Note 4
R111	100Ω	3		BTS-100	Note 4

Note 1. Some versions use a 470KΩ 1W resistor in this application.
Note 2. Some versions use a 12KΩ 1W resistor in this application.
Note 3. Used only with Sync stability control No. 40X405.
Note 4. Not used in some versions.
† Items R77A, R77B, R77C, C63A, C63B, C63C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Wells-Gardner PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC	525VCT @ 175mA	5V @ 2A	6.3V @ 9.6A	43X394-A		P6B30 ①	P8133 ②	26B33 ③	R-8U6C ①

① Parallel and phase 5.3V ④ 6A windings, tape 5.3V ⑤ 1.2A winding.
② Tape high HV winding, tape 5V ⑥ 2A winding. Parallel and phase 6.3V ⑦ 5A windings.
③ Parallel and phase 6.3V windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	Wells-Gardner PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	54X10	B6702	A-3003	209T1	V405	A-8125	26A03	A-9TX
T3	Horiz. Output Trans.	53X355	FB419 & RF800	HVO-36 & HVO-37	235T1 & 209T1	X094 & X095	A-8253 *	FLY-15 & FLY-16	D-50 & D-51
T4	Vert. Output Trans.	51X173	21B00	A-2833		V303	A-8142	26S72	A-108X
T5A	Yoke(90°)Horiz.(43MR)	9A2885-1 ⑨	DF607 ⑩	MDP-82 ⑪	235DH ⑫	Y90F(4A3)	DY-16A ⑬	Y-16 ⑭	Y-41-1 ⑮
B	Vert.(38AM)	9A2885 ⑨ 2A435 ⑧				DY-15 ⑬			
T6	Width Coil (1-8MR)	9A3281	RF803 ⑩	MWC-6	21UR1	20UR16	WC-8	WC-32	WC-12 ⑯

① Drill new mounting hole(s).
② Use 8 to 1 turns ratio.
③ Connect as auto transformer.
④ Includes resistance R88 and R87.
⑤ Alternate Wells-Gardner part number.
⑥ Tape over cover and centering device.
⑦ Use original rear cover and centering device.
⑧ Use original horizontal yoke damping network.
⑨ Do not use tap.
⑩ Connect to coded red and blue terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordorson Replacement Connections	Triad Replacement Connections
8	9	9	9	9	9	9	9
7	7	7	7	7	1	7	7
3	7	7	7	7	7	7	7
2	4-Also See Note ⑪	4-Also See Note ⑪	4-Also See Note ⑪	"F"-Also See Note ⑪	3-Also See Note ⑪	"F"-Also See Note ⑪	4-Also See Note ⑪
1	3	3	3	3	3	3	3
5	1	1	1	1	4	1	1
Connect With (as) Arrow	1 & 5	Terms. #1 & #2 of RF800 Across 3 & 1	MWC-11 Across 3 & 1	212R1 Across 3 & 1	209R16 Across 3 & 1	WC-18 Across 3 & 1	Red & Blue Terms. of WC-12 Across 3 & 1
Special Note	⑫	⑬	⑭	⑮	⑯	⑰	⑱

⑪ Connect approximately 100-150MMF ⑫ 2KV in series with resistor R104, and connect across horizontal yoke terminals #3 and #7.
⑫ Change value of resistors R55 and R56 as necessary to obtain required peak to peak pulse voltage at plate of V8, AGC Keying tube.
⑬ Ground either terminal #6 or terminal #7.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Wells-Gardner PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T7	4.7KΩ	3-4Ω	51X176	21B09	A3803	A3877			

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA Wells-Gardner PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	10"	PM	3-4Ω	12A353	10A31	237S1	① Used in some versions.
	8"	PM	3-4Ω	12A528	6A1	229S1	
SP2	4"	PM	3-4Ω	12A552	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Wells-Gardner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordorson PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω	31TA-413							
L2	Ant. Matching Trans.	0Ω	0Ω	31TA-413							
L3	FM Trap	0Ω		31T-407							
L4	IF Trap	3Ω		31T-418-01							
L5A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-303-B							Channel 2.
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-303-D							Channel 3.
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-304-D							Channel 4.
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-305-D							Channel 5.
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-306-D							Channel 6.
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-307-D							Channel 7.
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-308-D							Channel 8.
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-309-D							Channel 9.
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-310-D							Channel 10.
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-311-D							Channel 11.
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-312-D							Channel 12.
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-313-D							Channel 13.
L6	Fil. Choke	0Ω		34A-732							
L7	Neut. Coil	0Ω		31B-727							
L8	RF Coil	0Ω		25A-154-01							
L9	Conv. Plate	.4Ω		31UA-505							
L10	39MC Trap	0Ω		34A2359				TV-152	6225		
L11	1st. Video IF	.1Ω		34A2365				TV-131	6225		
L12	2nd. Video IF	.3Ω		34A2351					6223		Includes 47.25MC Trap.
L13	3rd. Video IF	.8Ω		34A2364					6221		Includes 41.25MC Trap.
L14	Series Peaking Coil	5.3Ω		34A2375		19-3035		TV-180	6176		30 Microhenries.
L15	Series Peaking Coil	9.5Ω		34A35		19-3095*		TV-181*	6177*		82 Microhenries; Wound On 3. 9KΩ Resistor.
L16	Shunt Peaking Coil	20Ω		34A34		19-4400		TV-190	6194		360 Microhenries.
L17	4.5MC Trap	1.6Ω		34A2352							
L18	Shunt Peaking Coil	10Ω		34A36		19-3100		TV-181	6177		100 Microhenries.
L19	Shunt Peaking Coil	11Ω		34A1		19-3100a		TV-181a	6177a		100 Microhenries; Wound On 2700 Resistor.
L20	Series Peaking Coil	19.5Ω		34A13		19-4160		TV-184a	6130a		160 Microhenries; Wound On 5.6KΩ Resistor.
L21	Shunt Peaking Coil	18Ω		34A37		19-3250a		TV-185a	6181a		235 Microhenries; Wound On 8.2KΩ Resistor.
L22	1st. Sound IF	2.1Ω		34A2362							
L23	2nd. Sound IF	3.5Ω	3.5Ω	34A2366		17-3495		TV-113	6203		
L24	3rd. Sound IF	3.5Ω	3.5Ω	34A2368		17-3495		TV-113	6203		
L25	Quadrature Coil	6Ω		34A2367		20-1005			1480		
L26	RF Choke	.1Ω		34A2360		19-1001			4604		1.5 Microhenries.

* Parallel with 3.9KΩ resistor
● Parallel with 270Ω resistor.
● Parallel with 8.2KΩ resistor
● Parallel with 22KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Wells-Gardner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordorson PART No.	NOTES
L27	78Ω		9A2372			62H ①				Horiz. Osc. Tapped @ 55Ω. Horiz. Waveform.
L28	60Ω		9A2371							

† Enlarge mtg. hole

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT (DC)	REPLACEMENT DATA Wells-Gardner PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
L29	.270A	41Ω	12H	52X95-4	C6037 ①	C3966 ①	C8326 ①	C8326 ①	20C44 ① C-23X ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Wells-Gardner PART No. FUSE	Wells-Gardner PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	Merit PART No. FUSE	BUSS PART No. HOLDER
M1	N	4/10A 125V	16X045	16X163	313. 400 (N 4/10A)	346009	N 4/10	HN 3/10-1

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PARTS LIST AND DESCRIPTIONS (Continued)

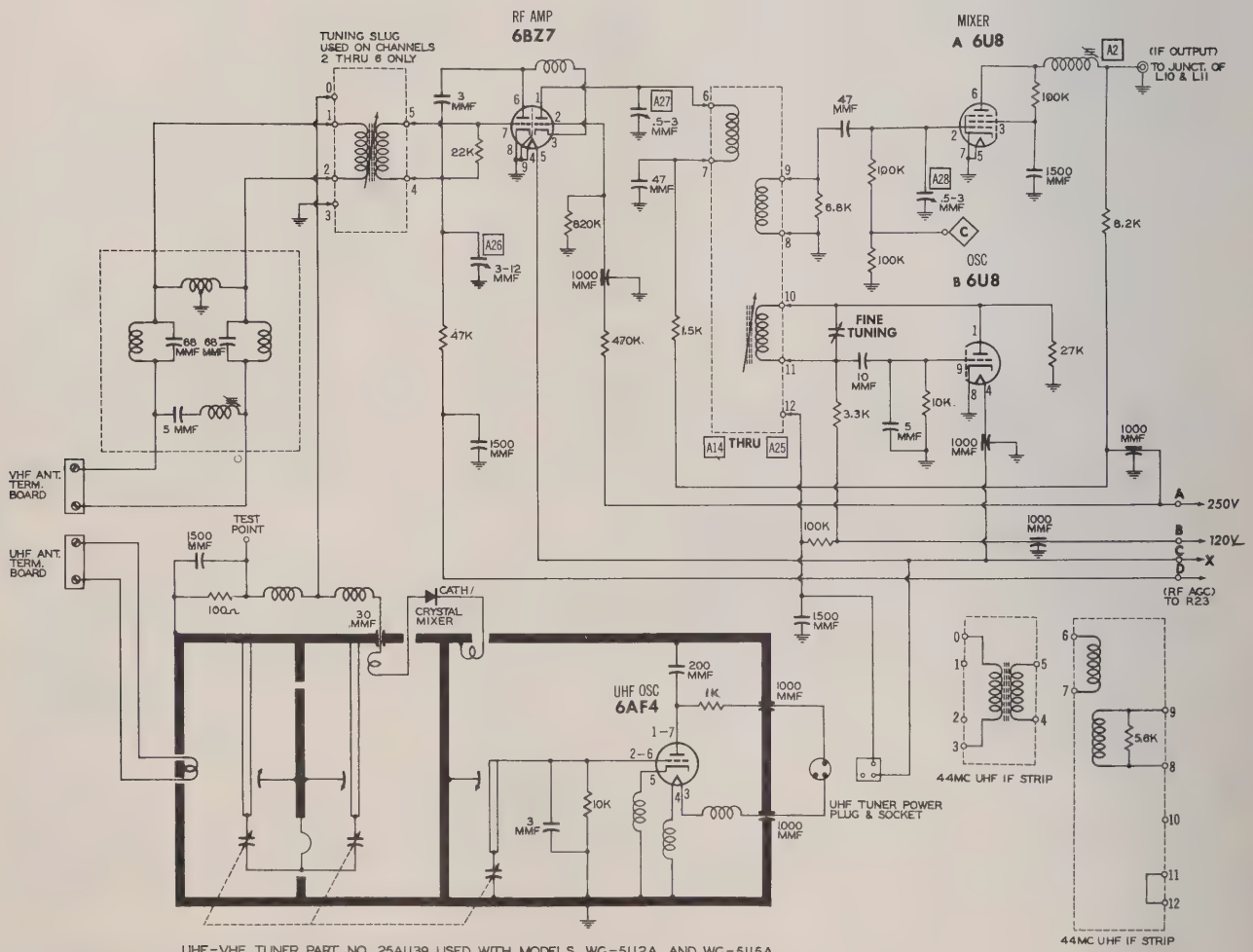
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		Wells-Gardner PART No.	SYLVANIA PART No.	
M2	1N295 *	17X190	1N60	Video Detector (Pigtail)

* Some versions may use crystal diode types CK706A or 1N60.

MISCELLANEOUS

ITEM No.	PART NAME	Wells-Gardner PART No.	NOTES
M3	Dial Light	7A103	#47
M4	Tuner	25A1137	VHF - Models 321A61C-A-522, 321A61C-A-578, 2321A61C-A-580
M5	Tuner	25A1139	VHF-UHF Combination; Models 321A61U-A-522,-578,2321A61U-A-580
M6	Video Det. Assy.	9A2370	Includes M2, Coils and Capacitors
M7	Centering Magnet	2A435	Includes Deflection Yoke (T5) Rear Cover
M8	Ion Trap	2A421	
B3	Trimmer Cap.	17A271	Horizontal Drive (170-700MMF)
	Knob	S-38A69	Fine Tuning Assembly-VHF Models
	Knob	S-38A68	Channel Selector Assembly-VHF Models
	Knob	S-38A70	Contrast Assembly-UHF-VHF Models
	Knob	S-38A71	On-Off-Volume Assembly-UHF-VHF Models
	Knob	10A858-2	Fine Tuning Assembly (Mahogany Cabinets) UHF Models
	Knob	10A858-3	Fine Tuning Assembly (Oak Cabinet) UHF Models
	Knob	S-38A72	VHF Channel Selector Assembly -UHF Models
	Knob	S-38A73	UHF Channel Selector Assembly-UHF Models
	Knob	S-38A74	On-Off-Volume Assembly-UHF Models
	Knob	10A861-1	Secondary Controls (3 used)



UHF-VHF TUNER PART NO. 25A1139 USED WITH MODELS WG-5112A, AND WG-5115A

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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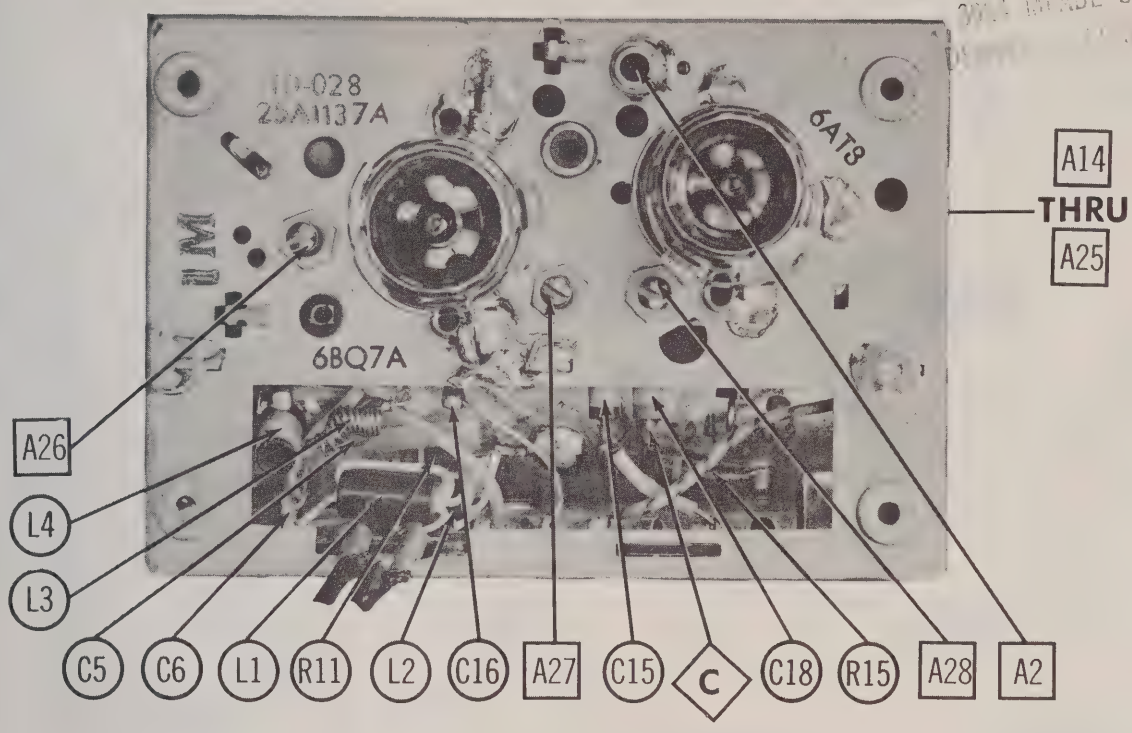
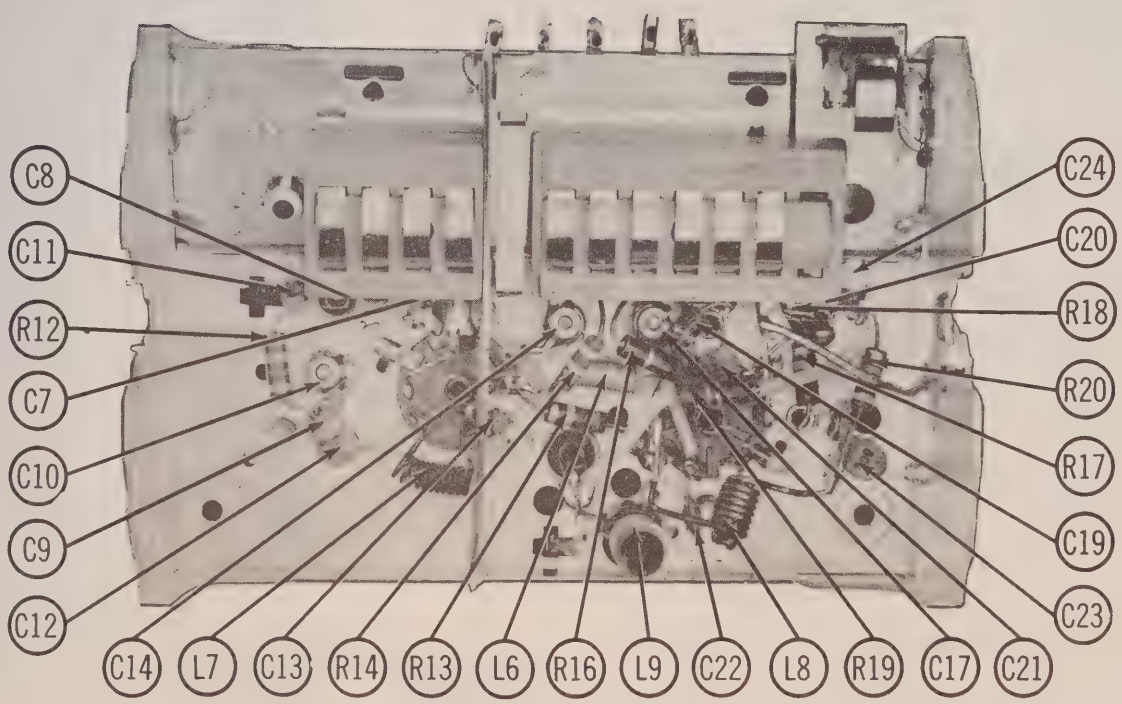
UHF VHF TUNER SCHEMATIC

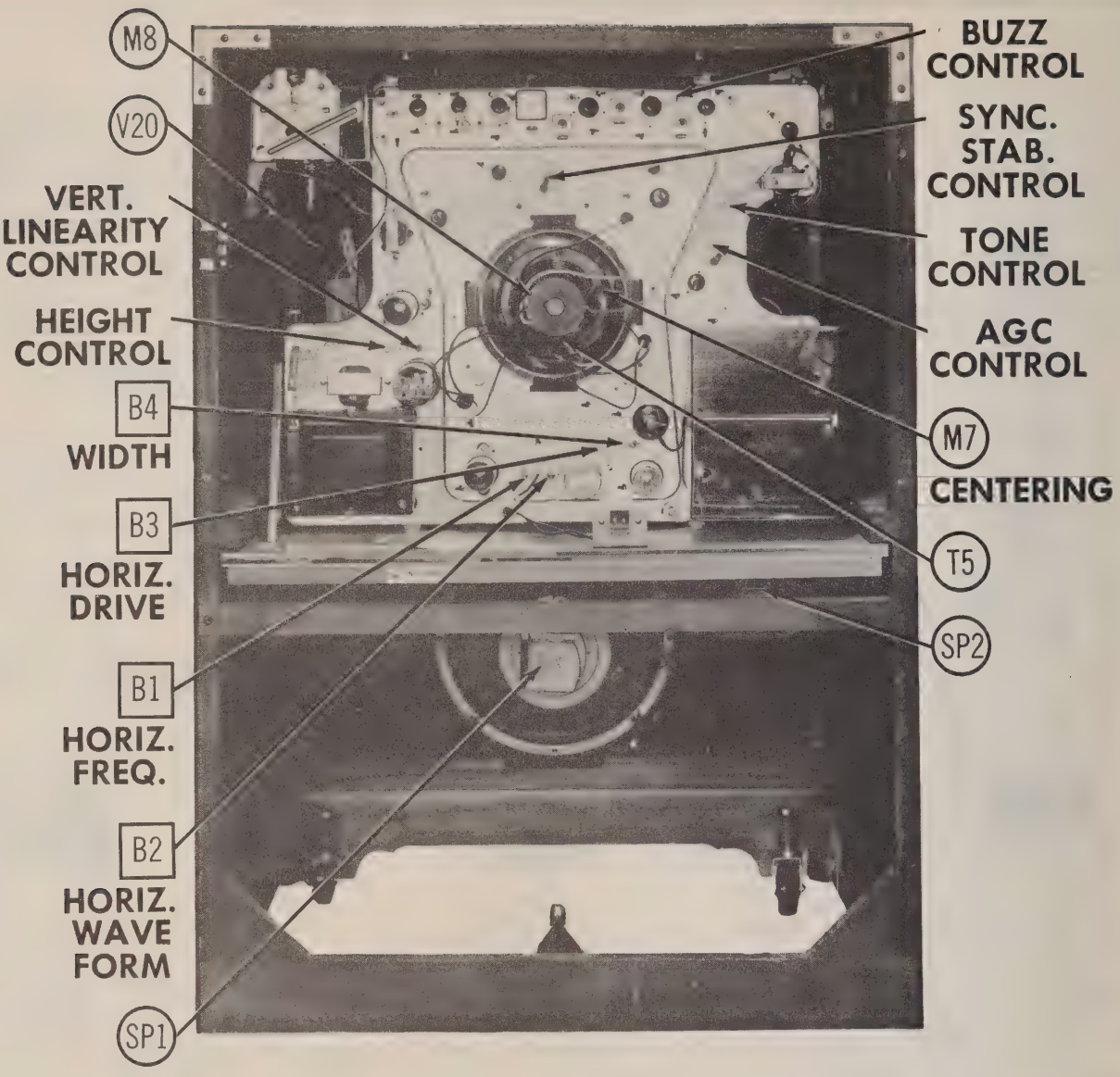
L. F. BLANKENSHIP



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Set the contrast control for normal contrast.

1. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

2. Connect the vertical amplifier of an oscilloscope thru 10MMF to point ◇ . Connect the low side to chassis. Adjust the waveform slug (B2) until a waveform similar to Fig. 6 is obtained. While making this adjustment, keep the picture in sync with the horizontal hold control and if necessary, B1.

3. With picture in sync, turn contrast control fully counter clockwise and the brightness control clockwise so that the picture appears to be washed out. Turn the horizontal drive control (B3) clockwise until a white vertical line appears and then back slightly counter clockwise until the line disappears.

4. Adjust the width control (B4) until the picture just fills the picture mask horizontally. Reset contrast and brightness controls for normal picture.

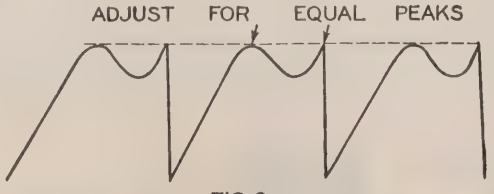


FIG. 6

PHOTOFACT* Folder

*TRADE MARK

ZENITH MODELS X2359,U,Z2360R, RU, Z3012H, HU, R, RU, Z3014H, HU, R, RU (Ch. 22Z20, Q)

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ZENITH MODEL Z2359

TRADE NAME	Zenith	MODELS	CHASSIS
		Z2359, U, Z2360R, RU	22Z20, U
		Z3012H, HU, R, RU, Z3014H, HU, R, RU	22Z20Q, U
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois		
TYPE SET	Television Receiver		
TUBES	Twenty-two		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 2.38 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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ZENITH MODELS X2359,U,Z2360R, RU, Z3012H, HU, R, RU, Z3014H, HU, R, RU (Ch. 22Z20, Q)

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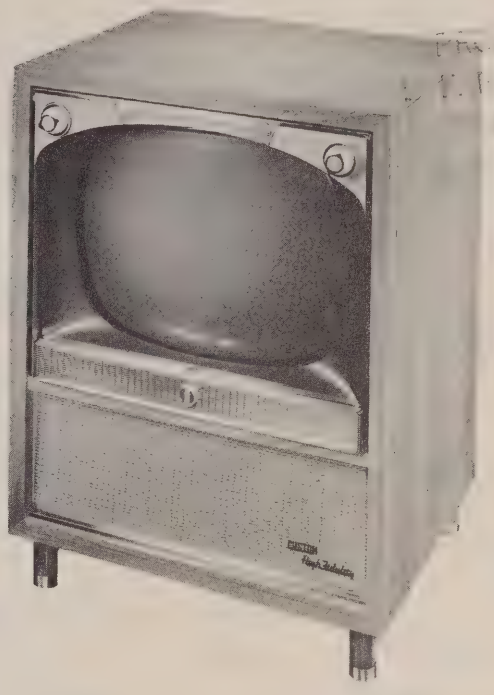

MODEL CHASSIS

Z2359 ..... 22Z20

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 push-on type control knobs from front panel of cabinet.

2. Remove 7 wood screws. Remove rear cover.

3. Disconnect speaker leads.

4. Remove 2 metal screws from rear of cabinet (holding tuner to cabinet) lower rear of tuner and pull out.

5. Remove on/off volume control by removing nut from front of cabinet.

6. Remove 4 chassis bolts. Remove chassis.

7. Remove 4 speaker nuts. Remove large speaker. Electrostatic speakers may be removed by prying staples from flaps.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove rear cover and supply power to set. Adjustments are made thru the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel. (Fine tuning control must be set to the center of its range before making adjustments). Use Zenith alignment wrench part #68-21 for adjustment.

PICTURE TUBE SAFETY GLASS CLEANING

Open control panel door, slide safety glass retainer located at the bottom edge of the safety glass to the left and remove. Then remove safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS

AGC CONTROL FIELD ADJUSTMENT

Turn set on and tune in the strongest TV signal in that area and observe the picture. Starting from the full clockwise position, turn the AGC control counter clockwise slowly until picture distorts and buzz is heard in the sound, then turn control clockwise for best picture and sound.

FRINGE LOCK CONTROL ADJUSTMENT

Turn the fringe lock control 1/4" turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switching off channel and back again. Slightly retouch the fringe lock control adjustment, if necessary, for maximum stability while testing as above.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator may be made from the front of the receiver. Adjust the horizontal hold until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on the rear panel of the chassis for maximum volume and MINIMUM buzz. If results are unsatisfactory, see alignment instructions.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart.)

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

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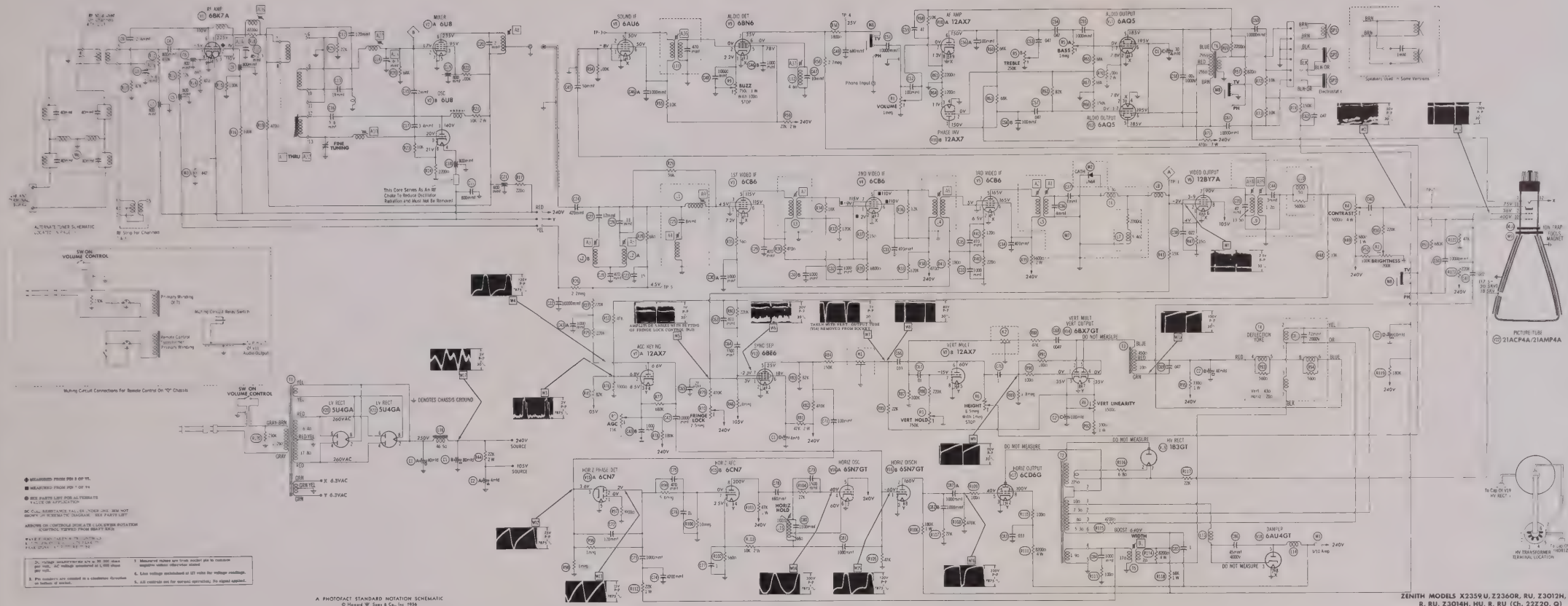

ZENITH MODELS X2359U, Z2360R, RU, Z3012H, HU, R, RU, Z3014H, HU, R, RU (Ch. 22Z2O, Q)

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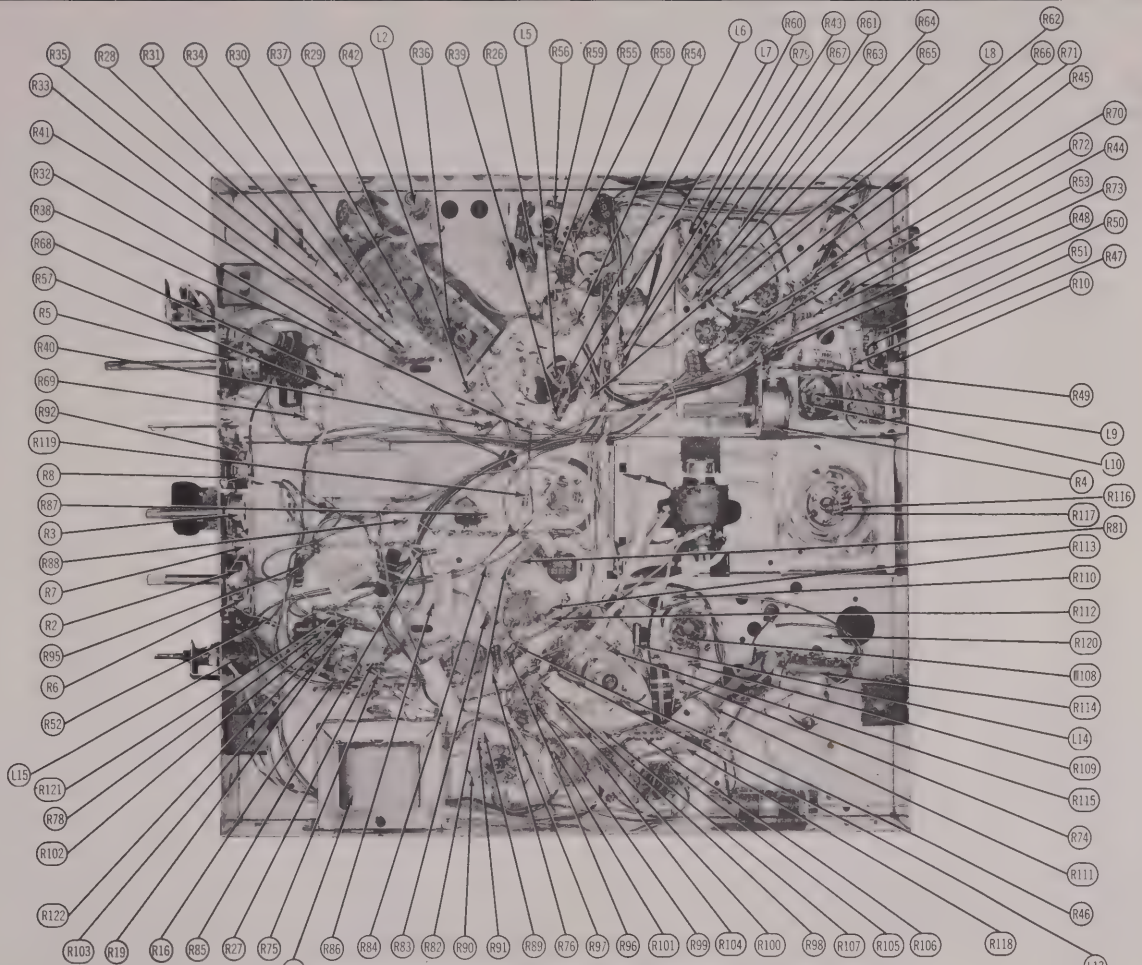
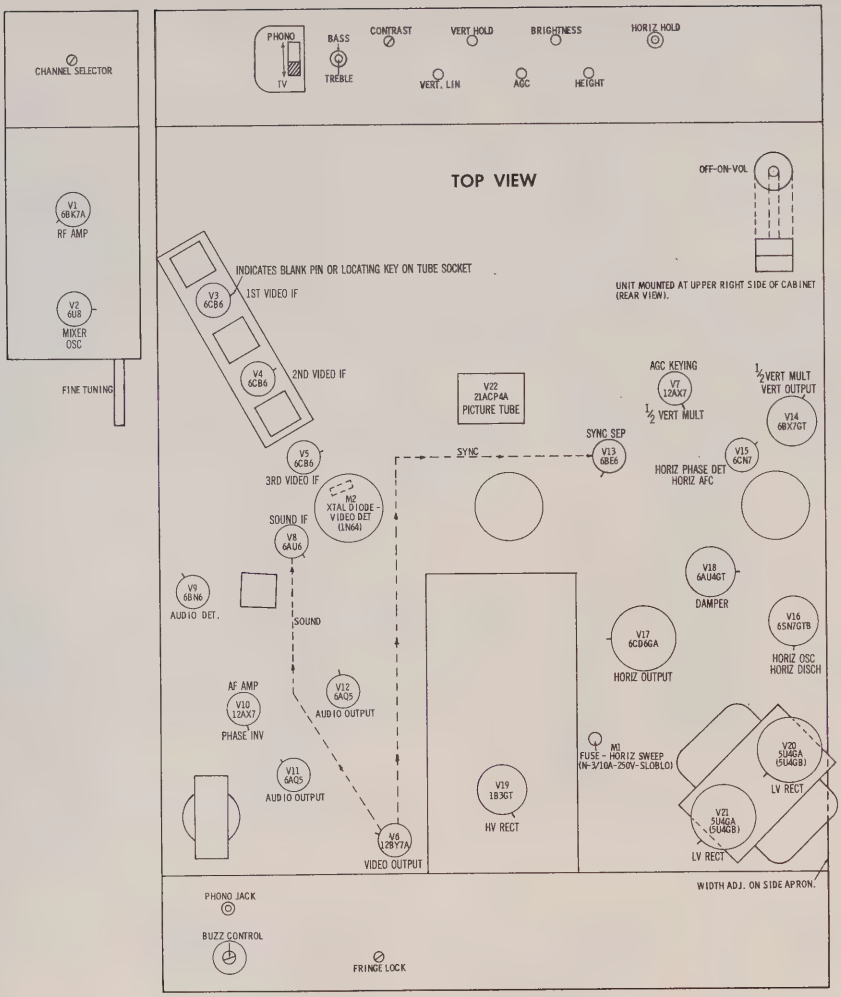


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V22
Has pic, no sound - V8, V9, V10, V11, V12
Overloaded picture - V7

SYNC FAILURE
No vert. sync - V7, V13, V14
No horiz. sync - V13, V15, V16
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V22, Fuse (M1)
No vertical deflection - V7, V14
Poor vert. linearity or foldover - V7, V14
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20, V21
Vert. off freq. - V7, V13, V14
Horiz. off freq. - V13, V15, V16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS - READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If the set is to be aligned with the picture tube removed, the high voltage lead should be securely taped away from the chassis.

VIDEO I. F. ALIGNMENT

Place the tuner turret cold-way between two channels.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C23. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC (10MC Swp)	38.75MC 45.75MC	See note above.	Vert. amp thru 10K to point (A). Low side to chassis.	A1, A3	Adjust for response curve similar to Fig. 1. If correct response cannot be obtained, check to see if slugs are entering the coils from the outside ends of the coils.
2.	"	High side to point (B) Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3, A4, A5	Reduce bias to zero. Turn sweep generator output to maximum. Increase scope gain to magnify trap portions of response curve. Adjust traps for response similar to Fig. 2.
3.	"	"	"	43.75MC 45.0MC 46.75MC	"	"	A6, A7, A8, A9	Replace 2 volt bias. Adjust for response curve similar to Fig. 3. Readjustment of A1 and A2 should not be required to obtain proper response.

OSCILLATOR ALIGNMENT

The master oscillator adjustment (A10) is made only if the individual oscillator adjustments fail to bring all channels within the range of the fine tuning control. If channels 2 through 6 fall within the fine tuning range, but the high channels do not, slight adjustment of A10 may bring the high channels in.
Ground the AGC lead from the tuner yellow lead to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	59.75MC	2	Vert. amp thru 10K to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap notch as shown in Fig. 4.
			83MC (10MC Swp)	85.75MC	5		A12	
			91MC (10MC Swp)	91.75MC	6		A13	
			79MC (10MC Swp)	81.75MC	5		A14	
			85MC (10MC Swp)	87.75MC	6		A15	
			177MC (10MC Swp)	179.75MC	7		A16	
			183MC (10MC Swp)	185.75MC	8		A17	
			187MC (10MC Swp)	191.75MC	9		A18	
			193MC (10MC Swp)	197.75MC	10		A19	
			201MC (10MC Swp)	203.75MC	11		A20	
			207MC (10MC Swp)	209.75MC	12		A21	
			213MC (10MC Swp)	215.75MC	13		A22	

FIG 1

FIG 2

FIG 3

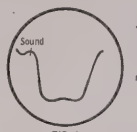


FIG. 4

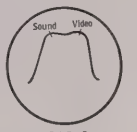


FIG. 5

FIG. 6

VHF RF AND MIXER ALIGNMENT

Ground the AGC lead (yellow wire) from the tuner to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	69MC (10MC Swp)	67.75MC 71.75MC	4	Vert. amp. to point (B). Low side to chassis.	A23, A24, A25	Adjust for response curve similar to Fig. 5.
6.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A26, A27	Adjust for response curve similar to Fig. 5. If bandpass is not correct, SLIGHTLY bend L19 (slotted tab in shield plate). Repeat steps 5 and 6 for optimum results on all channels.

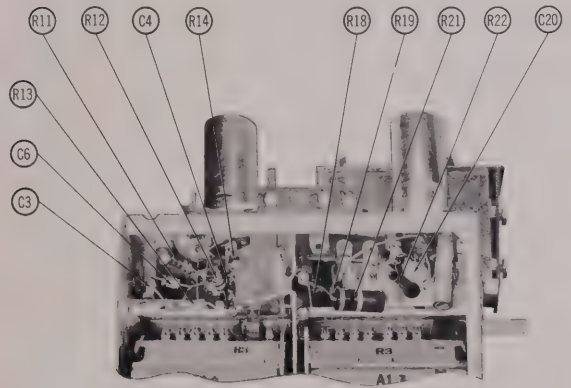
UHF TUNER ALIGNMENT

Any attempt to peak any one particular channel will usually cause serious degradation of the other channels.
No attempt should be made to adjust the oscillator unless the calibration is off more than three channels. Turn the UHF tuning dial to channel 54. The rotary arm of the tuner should be horizontal. If it is not, loosen the set screw on the pulley and turn the tuner shaft independently of the pulley until the rocker arm is horizontal with the channel indicator at channel 54. Tighten the set screw.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

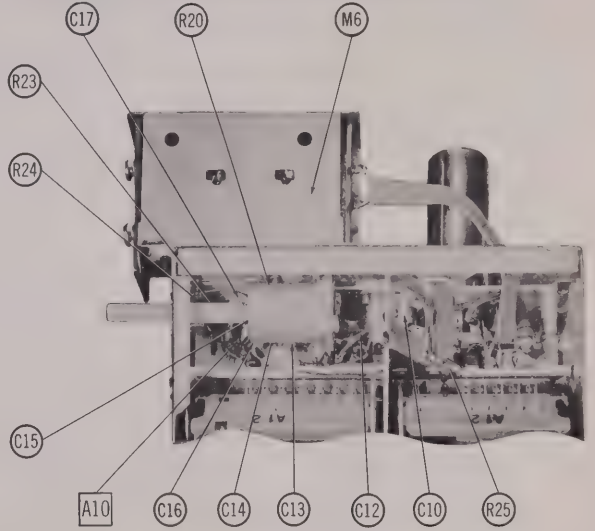
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon resistors	Across UHF antenna terminals with 120Ω in each lead.	71MC (10MC Swp)	72.25MC	84	Vert. amp thru 10K to point (A). Low side to chassis.	A28, A29, A30	Adjust for response similar to Fig. 6. When adjusting the oscillator adjustment (A30), two responses may be found. The correct setting is with the adjustment in the most counter clockwise position.
8.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response similar to Fig. 6. If the oscillator is off calibration more than 3 channels, adjust the oscillator travel (oscillator, mixer and antenna travel adjustments are the round thumb screws on top of the tuner) adjustment to scale. Care must be exercised when making this adjustment not to move the rocker arm out of its bearing. Adjust the mixer and antenna travel adjustments for maximum amplitude response.
9.	"	"	887MC (10MC Swp)	885.25MC	83	"	A31, A32, A33	Adjust A31 to place marker at 50% as in Fig. 6. Adjust A32 and A33 for maximum amplitude of response.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #6-17303 or equivalent) in series with the receiver antenna. Tune in a TV station and adjust the attenuator until the signal falls below the limiting level of the 6BN6 audio detector, as evidenced by a bias in the sound similar to super-regeneration.
Adjust the sound take-off transformer (A34 and A35), the sound IF coil (A36) and the quadrature coil (A37) for maximum sound and best quality. If the bass cannot be eliminated with the bass control, check the setting of the AGC control. If during any of the sound IF adjustments, the signal rises above the limiting level (bias disappears), increase the attenuation until the bias returns.



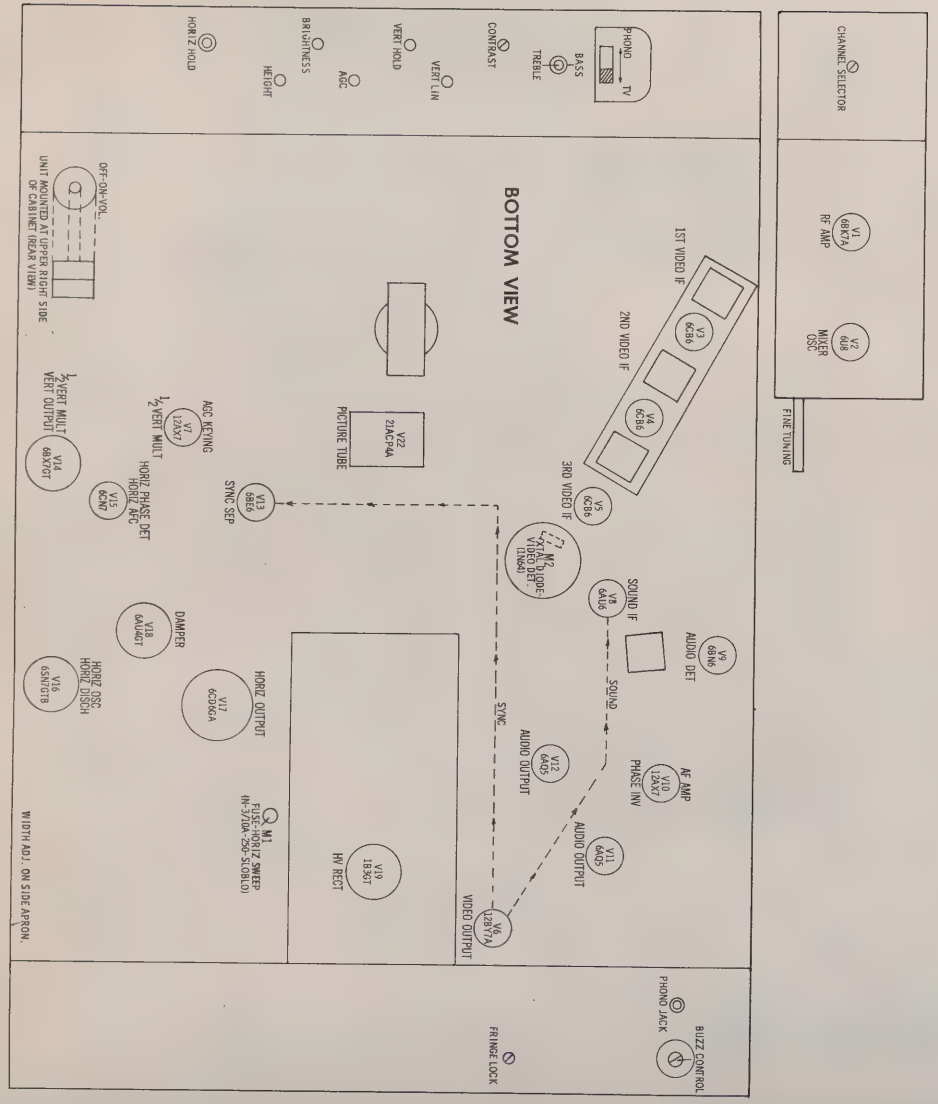
RF TUNER RIGHT SIDE



RF TUNER LEFT SIDE

ZENITH MODELS X2359U, Z2360R, RU, Z3012H, HU, R, RU, Z3014H, HU, R, RU (Ch. 22Z20, Q)

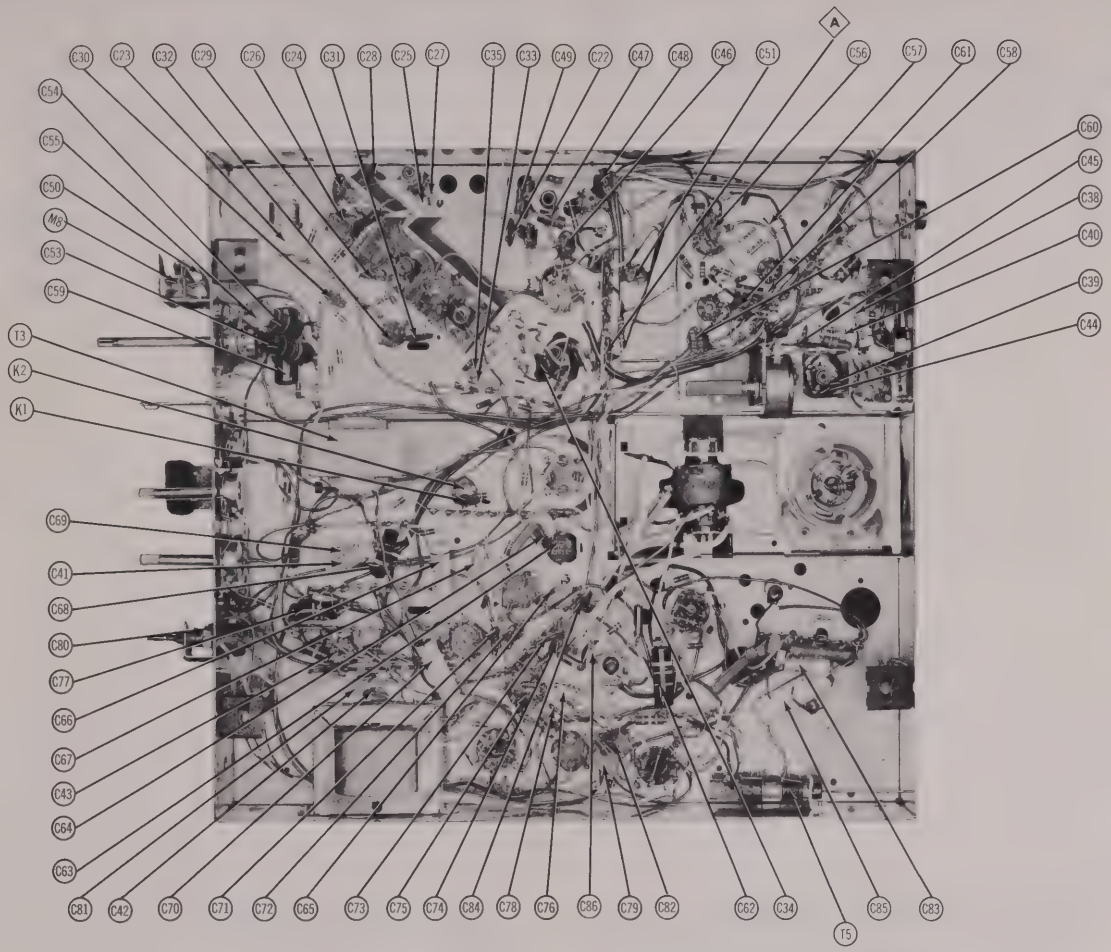
TUBE PLACEMENT CHART



RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BK7A	†700Ω	50K	INF	0Ω	.1Ω	INF	3.2Meg	47Ω	0Ω
V2	6U8	†10K	68K	†100K	.1Ω	0Ω	†250Ω	0Ω	2200Ω	†12.5K
V3	6CB6	1.1Meg	450Ω	.1Ω	0Ω	▲470Ω	▲470Ω	0Ω		
V4	6CB6	▲6800Ω	▲15Ω	.1Ω	0Ω	†500Ω	†500Ω	20K		
V5	6CB6	220Ω	340Ω	.1Ω	0Ω	†5600Ω	†5600Ω	0Ω		
V6	12BY7	15Ω	2700Ω	15Ω	0Ω	0Ω	.1Ω	†5600Ω	†22K	15Ω
V7	12AX7	700K	3300Ω	● 6500Ω	.1Ω	.1Ω	● *5Meg	● 600K	0Ω	0Ω
V8	6AU6	100K	0Ω	.1Ω	0Ω	†30K	†30K	0Ω		
V9	6BN6	● 300Ω	.3Ω	.1Ω	0Ω	†22K	4.6Ω	*2.7Meg		
V10	12AX7	†68K	50K	1200Ω	0Ω	0Ω	†68K	● 100K	2000Ω	.1Ω
V11	6AQ5	100K	100Ω	.1Ω	0Ω	†800Ω	†500Ω	100K		
V12	6AQ5	70K	100Ω	.1Ω	0Ω	†800Ω	†500Ω	70K		
V13	6BE6	17K	0Ω	.1Ω	0Ω	†50K	†47K	10Meg		
V14	6BX7GT	1.8Meg	†800Ω	● 500Ω	1.8Meg	†800Ω	● 500Ω	.1Ω	0Ω	
V15	6CN7	3900Ω	1.5Meg	900K	.1Ω	0Ω	560Ω	4Meg	†47K	.1Ω
V16	6SN7GT	47K	*240K	0Ω	32K	46Ω	11K	0Ω	.1Ω	
V17	6CD6GA	TP	.1Ω	0Ω	TP	470K	TP	0Ω	†8200Ω	TOP CAP *10Ω
V18	6AU4GT	NC	NC	200K	NC	†46Ω	NC	0Ω	.1Ω	
V19	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP *258Ω
V20	5U4GA	NC	20K	NC	17Ω	NC	16Ω	NC	20K	
V21	5U4GA	NC	20K	NC	17Ω	NC	16Ω	NC	20K	
V22	21ACP4A	0Ω	35K	PIN 10 *68K	PIN 11 ● 250K	PIN 12 .1Ω				

† MEASURED FROM PIN 2 OF V21.
▲ MEASURED FROM PIN 7 OF V4.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
* MEASURED FROM PIN 3 OF V18.
NC NO CONNECTION.
TP TIE POINT



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

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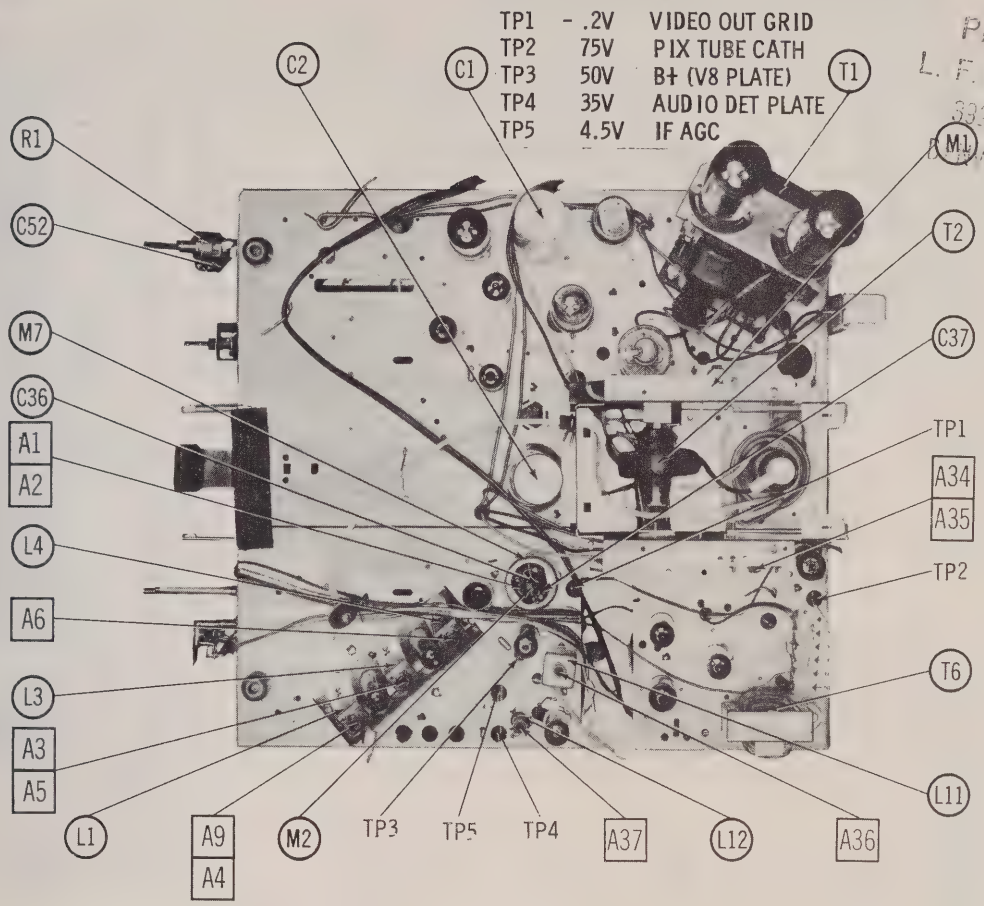
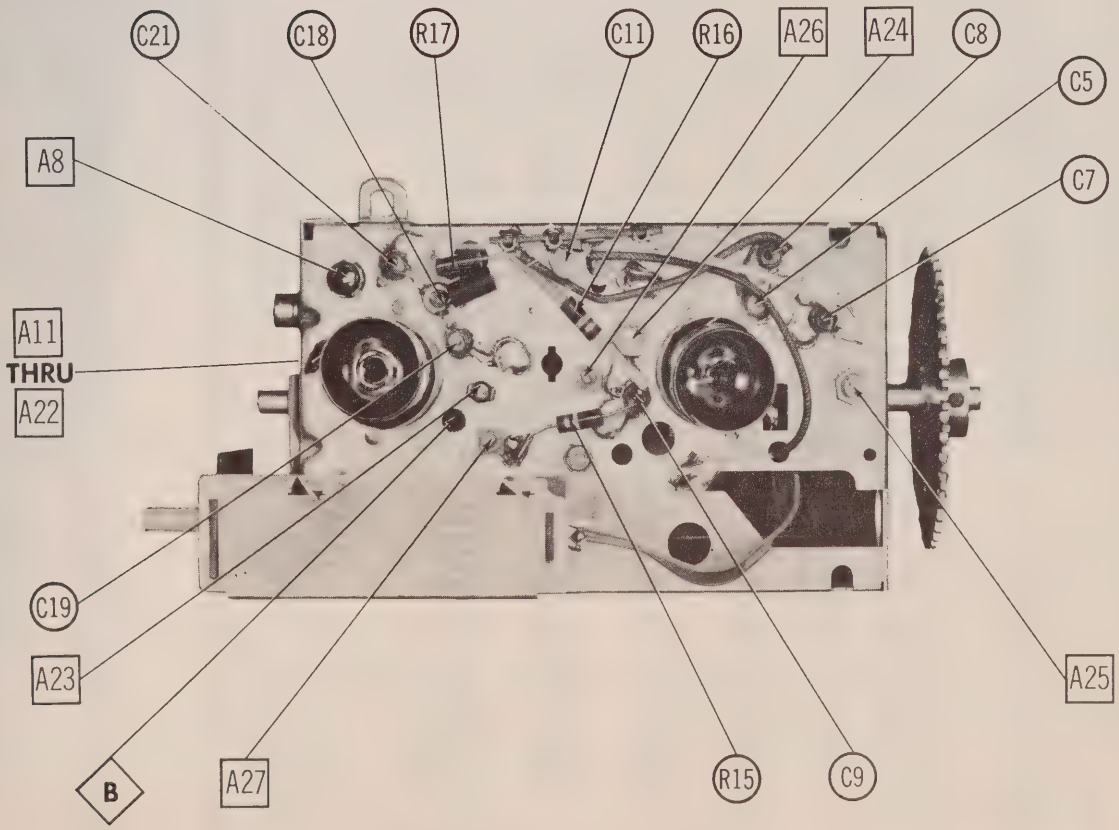


CHASSIS TOP VIEW



RF TUNER-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amplifier	6BK7A	
V2	Mixer-Oscillator	6U8	
V3	1st Video IF Amplifier	6CB6	
V4	2nd Video IF Amplifier	6CB6	
V5	3rd Video IF Amplifier	6CB6	
V6	Video Output	12AY7	
V7	AGC Keying-Vert Multi	12AX7	
V8	Sound IF Amplifier	6AU6	
V9	1st Det-Limiter	12AT7	
V10	AF Amp.-Phase Inverter	12AX7	
V11	Audio Output	6AQ5	

ITEM No	USE	TYPE	NOTES
V12	Audio Output	6AQ5	
V13	Sync Separator	6BA6	
V14	Vert Mult - Vert. Output	6BX7GT	
V15	Horiz. Phase Det. - Horiz. AFC	6CN7	
V16	Horiz. Osc. -Horiz. Disch.	6BW7GT	
V17	Horiz Output	6CD6GA	
V18	Damper	6AU4GT	
V19	HV Rectifier	1B3GT	
V20	LV Rectifier	5U4GA	
V21	LV Rectifier	5U4GA	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	ZENITH PART No	CBS PART No.	GENERAL ELECTRIC PART No	SYLVANIA PART No	
V22	21AC94A/ 21AMP4A ①	21AC94A ② 21AMP4A	21AC94A ③ Aluminized 21AMP4A ④ Silver screen "B5" 21AC94 21AMP4	21AP4A	

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	ZENITH PART No	AEROVOX PART No	CORNELL-DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No	
C1A	⌀40	400	22-2597	AFH4-93-40	CG570	FP431-R	TMQ-150	Q-025	TVL-4672	
B	⌀30	400			BR435	TC80		MT-4540		
C	⌀30	400								
D	4	350								
C2A	⌀4	350	22-2419	AFH-150- T5	DC888	FP484.6	TMQ-173	Q-442 MT-4504	TVL-4606	
B	⌀40	400								
C	100	50								
D	⌀10	475								

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	ZENITH PART No	AEROVOX PART No	CENTRALAB PART No	CORNELL-DUBILIER PART No	ERIE PART No	MALLORY PART No	SPRAGUE PART No	
C3	2.5-8		22-2231							
C4	800		22-2331	BPD-0008	DD-801	GD87	ED-0008		SGA-78	
C5	500		22-2577							
C6	2.4		22-2306							
C7	600		22-2577							
C8	800		22-2577							
C9	800		22-2577							
C10	2-5.2		22-2453							
C11	800		22-2331	BPD-0008	DD-801	GD87	ED-0008		SGA-78	
C12	120		22-2291	N750-S1230	TCH-130	N044	TCT-130			
C13	19		22-2406							
C14	6-3		22-2504							
C15	3		22-2434	NPO-S12.2	TCZ-2R2	Z005	TCO-2.2		5TCCB-V22	
C16	5.6									
C17	3.4		22-2562							
C18	800		22-2577							
C19	800		22-2577							
C20	2		22-2365							
C21	800		22-2577							
C22	1000		22-3	BPD-01	DD-103	K062	ED-01	DC-511	5HK-61	
C23	15	200	22-2147	P288N-15		CUB2P15		GEM-3015	2TM-P15	
C24	470		22-6	BPD-0047	DD-471	K060	ED-470	UC-5347	SGA-747	
C25	15		22-2481	NPO-D18.2		Z018	TCO-S.2			
C26	12		22-2379							
C27	18		22-2379							
C28	470		22-6	BPD-0047	DD-471	K060	ED-470	UC-5347	SGA-747	
C29	470		22-16	BPD-0047	DD-471	K060	ED-470	UC-5347	SGA-747	
C30A	1000		22-21	BPD-2X001	DD3-103	DK069	ED3-001	DCD-521	5HK-3D1	
B	1000									
C31	470		22-6	BPD-0047	DD-471	K060	ED-470	UC-5347	SGA-747	
C32	1000		22-17	BPD-001	DD-102	K069	ED-001	DC-521	5HK-D1	
C33	1000		22-2123	BPD-001	DD-103	K069	ED-001	DC-521	5HK-D1	
C34	470		22-2524	BPD-0047	DD-471	K060	ED-470	UC-5347	SGA-747	
C35	470		22-2327	BPD-0047	DD-471	K060	ED-470	UC-5347	SGA-747	
C36	6		22-2860							
C37	7		22-2375							
C38	.022	200	22-2071	BPD-03	DF-303	CUB4S33	ED-03	GEM-4133	2TM-S33	
C39	47		22-2467							
C40	1	200	22-1771	P288N-1	DF-104	CUB2P1		GEM-301	2TM-P1	
C41	.022	400	22-2072	BPD-03	DF-303	CUB4S22	ED-03	GEM-4133	4TM-S22	
C42	1000		22-21	BPD-01	DD-103	K063	ED-01	DC-511	5HK-61	
C43A	1000		22-21	BPD-2X001	DD3-103	DK069	ED3-001	DCD-521	5HK-3D1	
B	1000									
C44	3		22-2343	NPO-S13	TCZ-3R3	Z007	TCO-3	2T-553	5TCCB-V33	
C45	50		22-2460	NPO-S150	TCZ-50	Z054	TCO-50	2T-545	5TCU-Q5	
C46A	1000		22-21	BPD-2X001	DD3-103	DK069	ED3-001	DCD-521	5HK-3D1	
B	1000									
C47	10		22-2721							
C48	10000		22-3	BPD-01	DD-103	K063	ED-01	DC-511	5HK-61	
C49	680		22-2220	S2G0	DE-681	TP50	GP-680	UC-5366	SGA-768	
C50	10000		22-3	BPD-01	DD-103	K063	ED-01	DC-511	5HK-61	
C51	10000		22-3	BPD-01	DD-103	K063	ED-01	DC-511	5HK-61	
C52	1000		22-5	BPD-001	DD-101	G043	ED-100	DC-531	SGA-73	
C53	.047	600	22-1844	BPD-05	DF-503	CUB4S47		GEM-4147	6TM-S47	
C54	.047	600	22-1844	BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C55	1000		22-17	BPD-001	DD-103	K063	ED-001	DC-521	5HK-D1	
C56A	100		22-22	BPD-0001	DD-101	G042	ED-100	DC-531	SGA-71	
B	100			BPD-0001	DD-101	G042	ED-100	DC-531	SGA-71	
C57	.047	600	22-1844	BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C58	.0015	600	22-1861	BPD-15-1000	DD-152	CUB6D1	HDS-1000	GEM-1031	6TM-D1	
C59	47	200	22-2146	P288N-47		CUB2P47		GEM-2047	2TM-P47	
C60	10000		22-3	BPD-01	DD-103	K063	ED-01	DC-511	5HK-61	
C61	10000		22-3	BPD-01	DD-103	K063	ED-01	DC-511	5HK-61	
C62	.047	600	22-1844	BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C63	470		22-6	BPD-0047	DD-471	K060	ED-471	UC-5347	SGA-747	
C64	3300		22-11	BPD-0033	DD-332	K077	ED-0033	UC-5333	5HK-D33	
C65	27		22-2459	S2J7	DE-270	TP26	GP-27	UC-5437	SGA-Q27	
C66	033	400	22-2825							
C67	01	300	22-2565	1684-01			IDM361		MB-1J	
C68	.047	600	22-1849	1684-0047			IBD347		MB-347	
C69	.047	200	22-1778	BPD-05	DF-503	CUB2S47		GEM-2347	2TM-S47	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	ZENITH PART No	AEROVOX PART No	CENTRALAB PART No	CORNELL-DUBILIER PART No	ERIE PART No	MALLORY PART No	SPRAGUE PART No	
C70	1	400	22-2061	P488N-1		DF-104	CUB4P1		GEM-401	4TM-P1
C71	100	500	22-1442	NPO-D100	TCZ-100	Z2R5T1	TCO-100		MCB235	MS-31
C72	120	500	22-2306	NPO-D120	TCZ-120	Z2R5T12	TCO-120			MS-312
C73	1000		22-17	1464-001		IR5D1			MCB255	MS-21
C74	4700		22-14	1454-0047		IR5D47				MS-247
C75	470		22-6	BPD-0047	DD-471	K060	ED-470	UC-5347		SGA-747
C76	.01	200	22-1809	BPD-01	DF-103	CUB4S1	GP-10000	GEM-411		4TM-S1
C77	.1	200	22-1777	P288N-1	DF-104	CUB2P1		GEM-301		2TM-P1
C78	680	500	22-2125	1464-00068		DS-681	IR1T68	ED-650		MB-368
C79	1500	500	22-2386	DS-0015		DS-152	IWSD15	ED-1500	MCB36	1FM-215
C80	1200	500	22-2380	1464-0001			IR5D21			MS-321
C81	1000		22-2536							
C82A	1000		22-21	1464-001			IR5D1	ED-1000	MCB255	MS-21
B	1000			1464-001			IR5D1	ED-1000	MCB255	MS-21
C83	.033	400	22-2826	BPD-03	DF-303	CUB6S33			GEM-6133	6TM-S33
C84	1000		22-17	1464-001			IR5D1	ED-1000	MCB255	MS-21
C85	.1	600	22-1841	P668N-1	DF-104	CUB6P1			GEM-601	6TM-P1
C86	47	400	22-2588							
C87	72	3000								

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No	
R1A	1Meg	1	63-3830	B-70-S	A47-1Meg-Z	Qi3-157	U53	Volume control
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWZ-12	70-1	UB-28	Attach to R1A
R2A	200K	½	63-3572	AB-50	A47-200K-S	Qii-189	U43	Brightness control
B	Shaft		Not Req.	AK-6	KS8-3	Not Req.	Not Req.	Attach to R2A
R3A	750K	½	63-3390	AB-66	A47-750K-S	Qii-185	U54	Vert. Hold
B	Shaft		Not Req.	AK-6	KS8-3	Not Req.	Not Req.	Attach to R3A
R4	5000	4	63-3201	SVP999				Contrast- wire wound
R5A	1Meg	½	63-3578				UF3EL	Bass control
B	250K		Not Req.				UH25A4	Treble control
R6A	2.5Meg with 1Meg stop	½	63-3617	MA-B9	M47-7.5Meg -S	Qii-163	*PTA9055L	Height control
B	Shaft		Not Req.	Not Req.	FS8-1/4	RQ	Not Req.	Attach to R6A
R7A	1M	½	63-3575	AB-50	A47-1M-S	Qii-119	TA3EL	AGC control
B	Shaft		Not Req.	AK-1	FS8-1/4	RQ	Not Req.	Attach to R7A
R8A	15000	½	63-3582	AB-6	A47-1500-S	Bii-109	TAP3SL	Vert. Linearity
B	Shaft		Not Req.	AK-1	FS8-1/4	TMS-437	Not Req.	Attach to R8A
R9	750Ω with 100Ω stop	1	63-3284		30-800-50		FL750	Buss control - wire wound
R10A	7.1Meg	½	63-3919	AB-96	A47-7.5Meg -S			Fringe Lock
B	Shaft			AK-1	FS8-1/4			Attach to R10A

* Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control.(Control viewed from shaft end, terminals down).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	OHMS	WATT	ZENITH PART No	IRC PART No		
R11	22K		63-1841	BTS-22K		
R12	470K		63-1897	BTS-470K		
R13	47K		63-1856	BTS-47K		
R14	47Ω		63-1729	BTS-47		
R15	100K		63-1869	BTS-100K		
R16	100K		63-1869	BTS-100K		
R17	220Ω		63-1758	BTS-220		
R18	47000		63-1818	BTS-4700		
R19	470Ω		63-1773	BTS-470		
R20	68K		63-1863	BTS-68K		
R21	10K	2	63-3170	BTS-10K		
R22	100K		63-1869	BTS-100K		
R23	10K		63-1838	BTS-10K		
R24	2200Ω		63-1800	BTS-2200		
R25	22K		63-1841	BTS-22K		
R26	2.5Meg		63-1886	BTS-2.5Meg		
R27	220K		63-1864	BTS-220K		
R28	68Ω		63-1757			
R29	56K		63-1859			
R30	470Ω		63-1772	BTS-470		
R31	56Ω		63-1753	BTS-56		
R32	150K		63-1873			
R33	150K		63-1873			
R34	33K		63-1848			
R35	5800Ω		63-1821			
R36	12K		63-1831			
R37	15Ω		63-1708	BTS-15		
R38	470Ω		63-1772	BTS-470		
R39	5600Ω	2	63-3223	BTS-5600		
R40	2200 9%		63-1756	BTS-220 9%		
R41	180Ω		63-1754	BTS-180		
R42	120Ω		63-1747	BTS-120		
R43	18K		63-1834	BTS-18K		
R44	22K	2	63-1866	BTS-22K		
R45	82Ω		63-1866	BTS-82K		
R46	10Meg		63-1963	BTS-10Meg		
R47	15Ω		63-1708	BTS-15		
R48	33K		63-1848	BTS-33K		
R49	6800	1	63-3390	BTA-680		
R50	220K		63-1864	BTS-220K		
R51	680K		63-1804	BTS-680K		
R52	100K		63-1870	BTS-100K		
R53	47K		63-1855	BTS-47K		
R54	100K		63-1870	BTS-100K		
R55	10K		63-1837	BTS-10K		
R56	1000Ω		63-1796	BTS-1800		
R57	82Ω		63-1782	BTS-820		
R58	2.7Meg		63-1859	BTS-2.7Meg		
R59	22K	2	63-3241	BTS-22K		
R60	68K		63-1863	BTS-68K		
R61	2200Ω		63-1799	BTS-2200		
R62	82K		63-1866	BTS-82K		
R63	68K		63-1863	BTS-68K		
R64	1200Ω		63-1759	BTS-1200		
R65	68K		63-1863	BTS-68K		
R66	150K		63-1877	BTS-150K		

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	OHMS	WATT	ZENITH PART No	IRC PART No		
R67	68K		63-1863	BTS-68K		
R68	10K		63-1837	BTS-10K		
R69	2200Ω		63-1799	BTS-2200		
R70	100Ω	2	63-1978	BTS-100		
R71	47Ω	7	63-3256	PWT-500		
R72	10K		63-1837	BTS-10K		
R73	10K		63-1837	BTS-10K		
R74	150K		63-1877	BTS-150K		
R75	330K		63-1884	BTS-330K		
R76	3300Ω		63-1906	BTS-3300		
R77	680K		63-1904	BTS-680K		
R78	180K		63-1880	BTS-180K		
R79	470K		63-1897	BTS-470K		
R80	220K		63-1864	BTS-220K		
R81	47K	2	63-1857	BTS-47K		
R82	470K		63-1897	BTS-470K		
R83	82K		63-1866	BTS-82K		
R84	150K		63-1877	BTS-150K		
R85	33K		63-1841	BTS-33K		
R86	220K		63-1864	BTS-220K		
R87	100K		63-1870	BTS-100K		
R88	47K		63-1855	BTS-47K		
R89	1.5Meg		63-1923	BTS-1.5Meg		
R90	100Ω		63-1764	BTS-100		
R91	100Ω		63-1764	BTS-100		
R92	330Ω	1	63-3248	BTA-330		
R93	560Ω		63-1776			
R94	560Ω		63-1776			
R95	330Ω	1	63-3286	BTA-330		
R96	1Meg		63-1811			
R97	9300Ω		63-1810			
R98	1Meg		63-1811			
R99	5.6Meg		63-1953			
R100	10Meg		63-1953			
R101	47K	1	63-1184			
R102	560Ω		63-1776			
R103	10K	2	63-3145			
R104	33K		63-1841			
R105	47K		63-1855			
R106	180K	1	63-3313			
R107	27K		63-1845			
R108	470K		63-1897			
R109	100Ω		63-1764			
R110	100Ω		63-1764	BTS-100		
R111	82000Ω	4	63-3303	PWS-8200		
R112	22K	1	63-1958			
R113	100Ω		63-1764			
R114	82000Ω	4	63-3705	PWS-8200		
R115	4700Ω		63-1816			
R116	6.8Ω		63-3205	PWS-6.8		
R117	33K		63-1841	BTS-33K		
R118	68K	1	63-1978	BTS-68K		
R119	180K		63-1886	BTS-180K		
R120	330K		63-3467	BTS-330K		
R121	220K		63-1864	BTS-220K		
R122	47K		63-1856	BTS-47K		

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI	SEC 1	SEC 2	SEC 3	ZENITH PART No	Hallderson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	
T1	117VAC @3.38A	520VCT @.360A	5VAC @ 6A	12.6VCT @5.4A	95-1471						

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA								NOTES
		ZENITH PART No	Hallderson PART No	Merit PART No	RCA TYPE No.	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No	
T2	Horiz. Output Trans.	S-60019 ①					K136 *	A-8375 *		D-62 *
T3	Vert. Output Trans.	95-1480			Z1900 ②③	A-3623 ③		V316 ⑤	A-8146 ⑤	3667 ③ ⑤	A-108X ③ ⑤
T4A	Yoke (90°)Horiz. (2.5 MH)	95-1509 ④			DF606 ④	MDF-91	23TD1 ④	Y90F12 ④	DY-13A ④	Y-14 ④	Y-40-1 ④
B	Vert. (41MH)										
T5A	Width-Series Coil (4-3.4MH)				MWC-10		WC-13 ⑥	WC-34 ⑥			
B	Parallel Coil (3 @ 2.2MH)	S-18748									

① Complete assembly includes: winding & terminal assembly, Zenith part #S-40133
Tertiary winding & terminal assembly, Zenith part #S-31264.
② Use 8 to 1 turns ratio
③ Connect as auto transformer.
④ Drill new mounting hole(s).
⑤ Cut and tape blanking winding lead.
⑥ Includes capacitor C67. Resistors R93 and R94.
⑦ Use original horizontal yoke damping network with capacitor C67 across terminals #3 and #7
⑧ Connect horizontal yoke terminal #3 to horizontal output transformer terminal #2, horizontal yoke terminals #2 and #7 to resistor R114, horizontal yoke terminal #1 to junction resistor R113 and width coil (orig. yoke black lead)

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Hallderson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	7			1	6	8		8
	1			3	5	5		5
	3			2	4	4		4
	2			4	NC See Note ⑨	NC See Note ⑨		NC See Note ⑨
	6			5	3	3		3
	4			6	2	2		2
	5			7	1	1		1
Special Notes				⑩	⑩	⑩		⑩

⑨ To reduce horizontal yoke 'ringing', connect 1000Ω, ½ watt in series with capacitor C87.
⑩ If the picture is out of phase, reverse AFC winding.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI	SEC	ZENITH PART No	Hallderson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	
T6	8.8K	3.4Ω	95-1398		S1001	A-3004 ①	A-3834	X3565	P-53X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS				REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.		ZENITH PART No	QUAM PART No	RCA TYPE No	
SP1	10"	PM	3-4Ω		45-764 A-33939 ① A-33939 ②	10A1023.2		① 3' Electrostatic Type
SP2								
SP3								

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	ZENITH PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	
L1	Ist. Video IF	.10		S-32502				Includes 41.25MC trap
L2A	41.25MC Trap	01		S-40235				
B	39.75MC Trap	01						
L3	2nd. Video IF	.10	.10	S-17907	17-5004 *	TV-126 *	6334 *	
L4	3rd. Video IF	.10	.10	S-18952				
L5	4th. Video IF	.10	.10	S-30625				
L6	Series Peaking Coil	5.3Ω		S-17815	19-3100	TV-181	6177	100 Microhenries
L7	Shunt Peaking Coil	5.4Ω		S-31562	19-3180 ⑧	TV-184 ⑧	6644 ⑧	160 Microhenries, wound in series on 2700Ω resistor
L8	Series Peaking Coil	.9Ω		S-31238	19-1004		6610	5.7 Microhenries
L8A	4.5MC Trap	12.5Ω		S-34738				
B	Ist. Sound IF	2.3Ω						
L8B	Series Peaking Coil	.6Ω		S-31563	19-3185 ⑧		6153 ⑧	136 Microhenries wound on 5600Ω resistor
L11	2nd. Sound IF	.31Ω	.8Ω	S-19962				
L12	Quadrature Coil	4.6Ω		S-19030			1480	
L13	RF Choke	.9Ω		S-32777	19-1005		6612	10 Microhenries
L14	RF Choke	.9Ω		S-32777	19-1005		6612	10 Microhenries

* Use adaptor plate.
⑧ Series with 2700Ω resistor.
= Parallel with 5600Ω resistor.

ZENITH MODELS X3359U, Z2360R, RU, Z3012H, HU, R, RU, Z3014H, HU, R, RU (Ch. 22220, Q)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L15	170Ω		S-19743	19-1577		6324				Tapped @ 68Ω

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L16	.380A	46.5Ω	2.74 HY	95-1399					

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ZENITH PART No.	REPLACEMENT DATA
K1	Vertical Integrator		87-5	No replacements
K2	Vertical Multivibrator Coupling		87-4	No replacements

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	"N"	3/10A 125V	136-34		333.300 ("N" 3/10A)	346008	"N" 3/10	HN 0-3/10

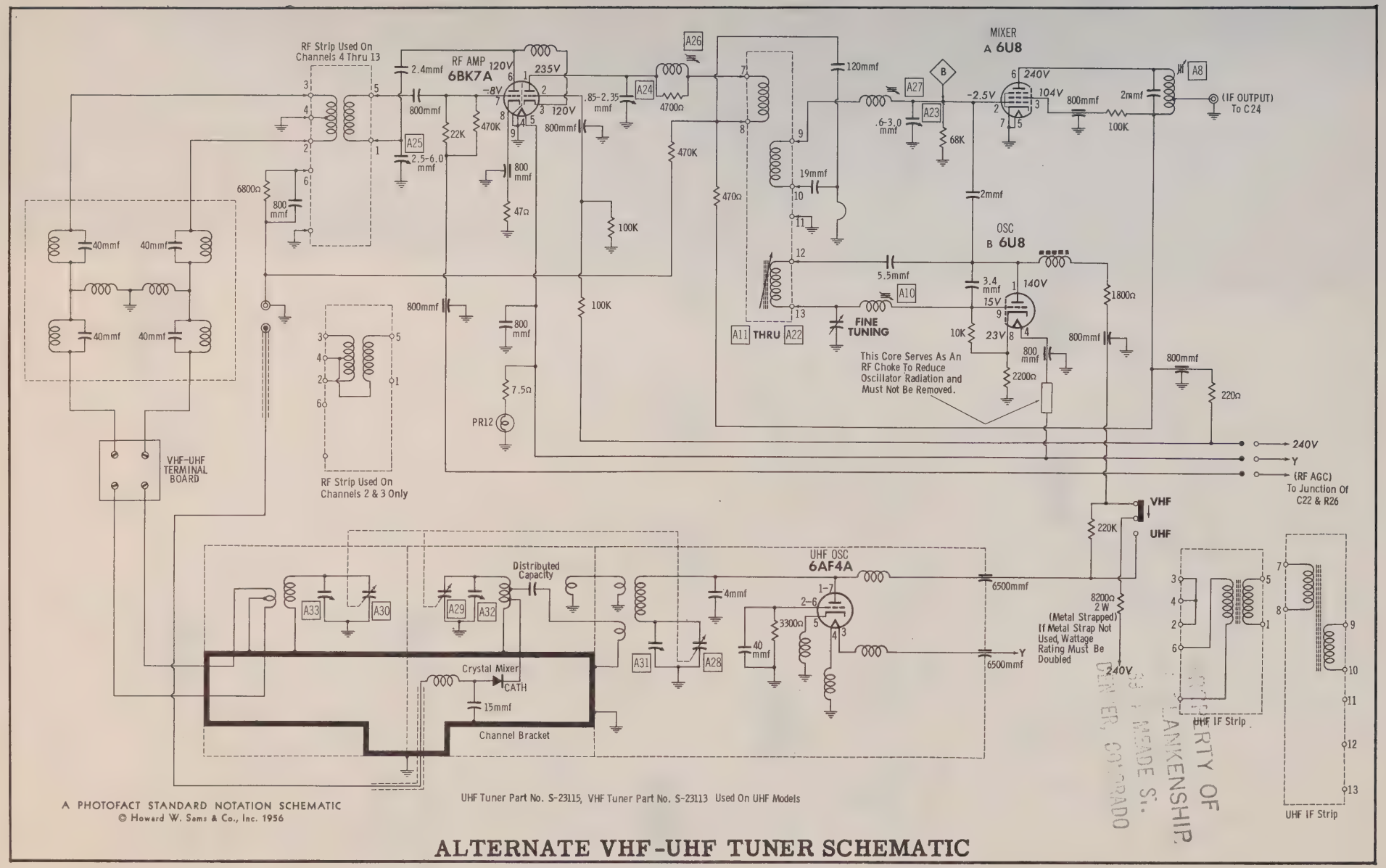
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		ZENITH PART No.	SYLVANIA PART No.	
M2	1N64	103-1	1N60	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Dial Light	100-198	#47
M4	Tuner	S-21735	VHF - Used in models Z2359, Z2359R, Z2360R
	Tuner	S-24712	VHF - Used in Models Z3012R, RU, Z3012H, HU, Z3014R, RU, Z3014H, HU
	Tuner	S-23113	VHF - Used in Models Z2359U, Z2359RU, Z2360RU
M5	Tuner	S-23115	UHF - Used in Models Z2359U, Z2360RU, Z2359RU
M6	Trap	S-24644 *	VHF antenna input filter
M7	Video Detector Assembly	S-21686	Includes M2, L5, L6, L7, C36 and C37
M8	TV-Phono Switch	85-555	Slide type (3PDT)
M9	Focus Magnet	S-23458 #	Includes centering device
M10	Ion Trap	S-17461	
M11	Correction. Magnet Assembly	S-18763	
M12	Correction Magnet Assembly	S-18763	
	Cabinet	14-2065	Model Z2359, U
	Cabinet	14-2065R	Model Z2359R, RU
	Cabinet	14-2066R	Model Z2360R, RU
	Cabinet	14-2057R	Model Z3021R, RU
	Cabinet	14-2057H	Model Z3012H, HU
	Cabinet	14-2067R	Model Z3014R, RU
	Cabinet	14-2067H	Model Z3014H, HU
	Knob	S-40024	Channel selector - Models Z2359, U, Z2359R, RU, Z3012H, HU, Z3014H, HU
	Knob	S-24580	Channel selector - Models Z3060R, RU, Z3012R, RU, Z3014R, RU
	Knob	S-22408	Fine tuning
	Knob	46-1585	On-off-volume - Models Z2359, U, Z2359R, RU, Z3012H, HU, Z3014H, HU
	Knob	46-1541	On-off-volume - Models Z2360R, RU, Z3012R, RU, Z3014R, RU
	Knob	46-1118	Horiz. Hold
	Knob	S-22935	Vert. Hold, brightness, contrast
	Knob	46-1018 $	Tone
	Safety Glass	19-225	

* Alternate part #S-24645.
\# Alternate part #S-22252 or S-20344.
$ Alternate part #46-1055.


RF Strip Used On Channels 4 Thru 13
RF AMP 6BK7A
MIXER A 6U8
OSC B 6U8
UHF OSC 6AF4A
A1 THRU A22
FINE TUNING
This Core Serves As An RF Choke To Reduce Oscillator Radiation and Must Not Be Removed.
VHF-UHF TERMINAL BOARD
RF Strip Used On Channels 2 & 3 Only
Distributed Capacity
Crystal Mixer
CATH
Channel Bracket
(IF OUTPUT) To C24
(RF AGC) To Junction Of C22 & R26
240V
Y
VHF
UHF
(Metal Strapped) If Metal Strap Not Used, Wattage Rating Must Be Doubled
UHF IF Strip
UHF IF Strip

UHF Tuner Part No. S-23115, VHF Tuner Part No. S-23113 Used On UHF Models

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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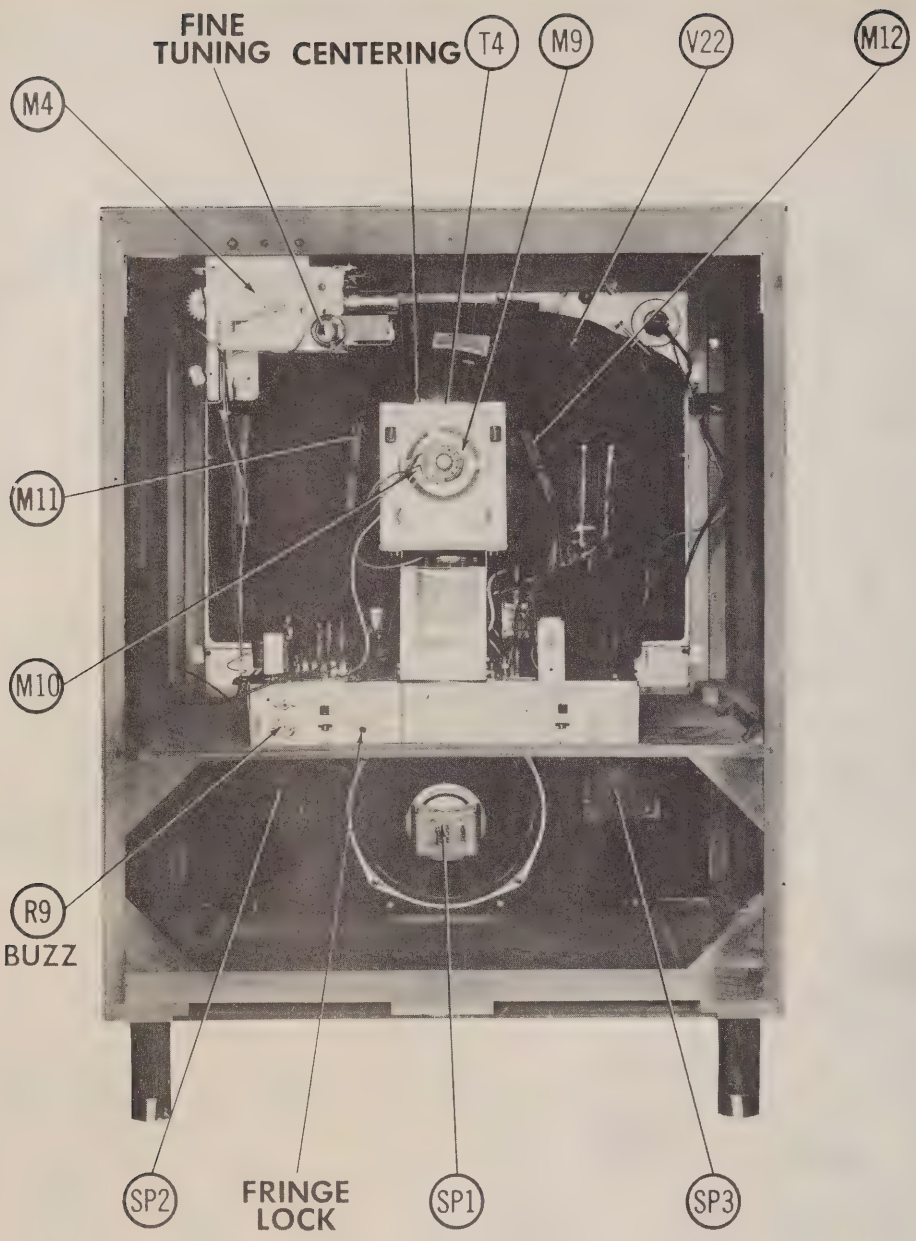
ALTERNATE VHF-UHF TUNER SCHEMATIC

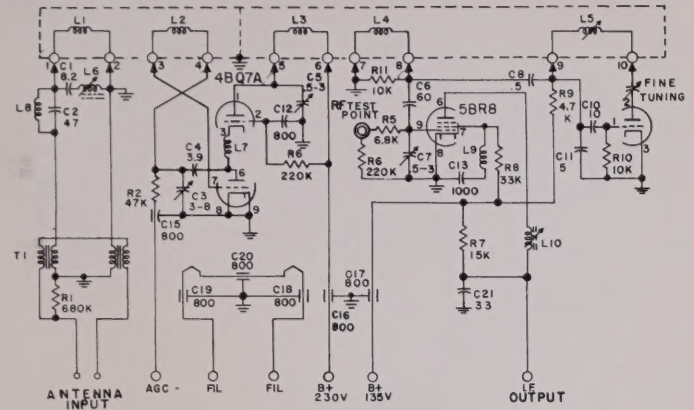


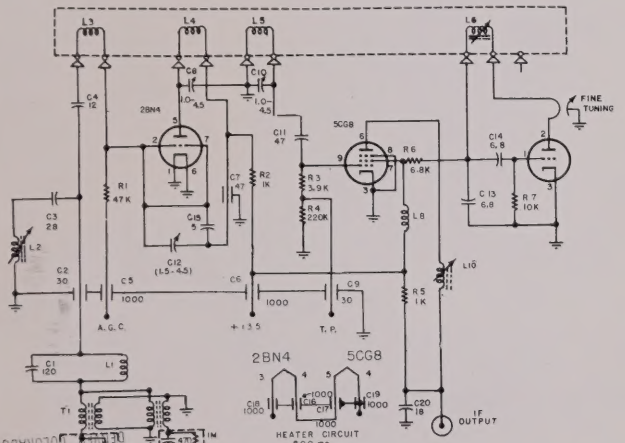
CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the horizontal hold control until the picture synchronizes horizontally.

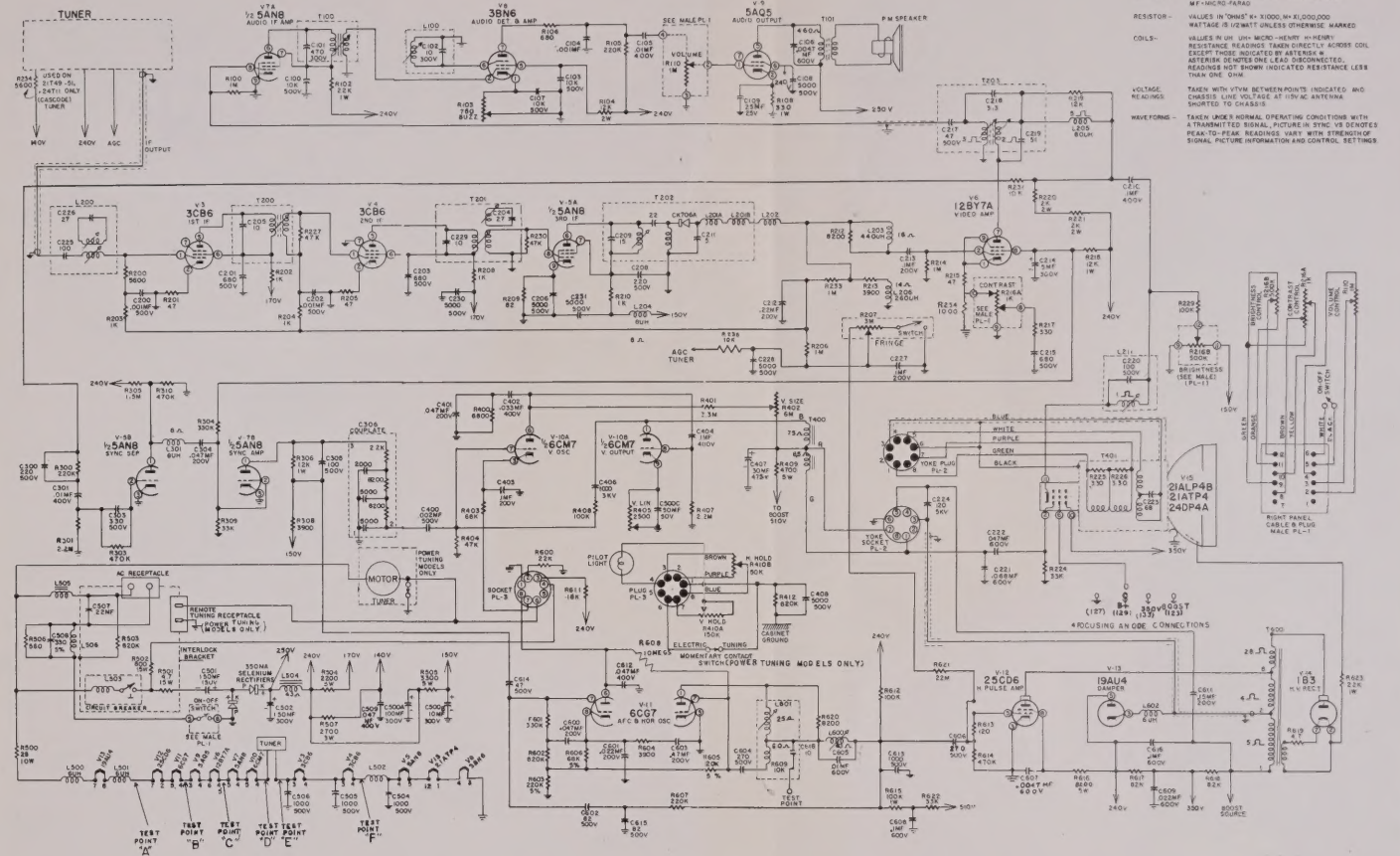
Adjust the width slug (B1) for a picture slightly wider than necessary to fill the picture mask horizontally.





CORONADO MODELS

TV1-9404A
TV1-9406A
TV1-9407A
TV1-9408A
TV1-9409A
TV1-9410A
TV1-9411A



SCHEMATIC COURTESY OF GAMBLES-SKOGMO INC.

PROPERTY OF
L. F. BLANKENSHIP
COLORADO

GENERAL ELECTRIC MODELS
21C700
21C701
21T500

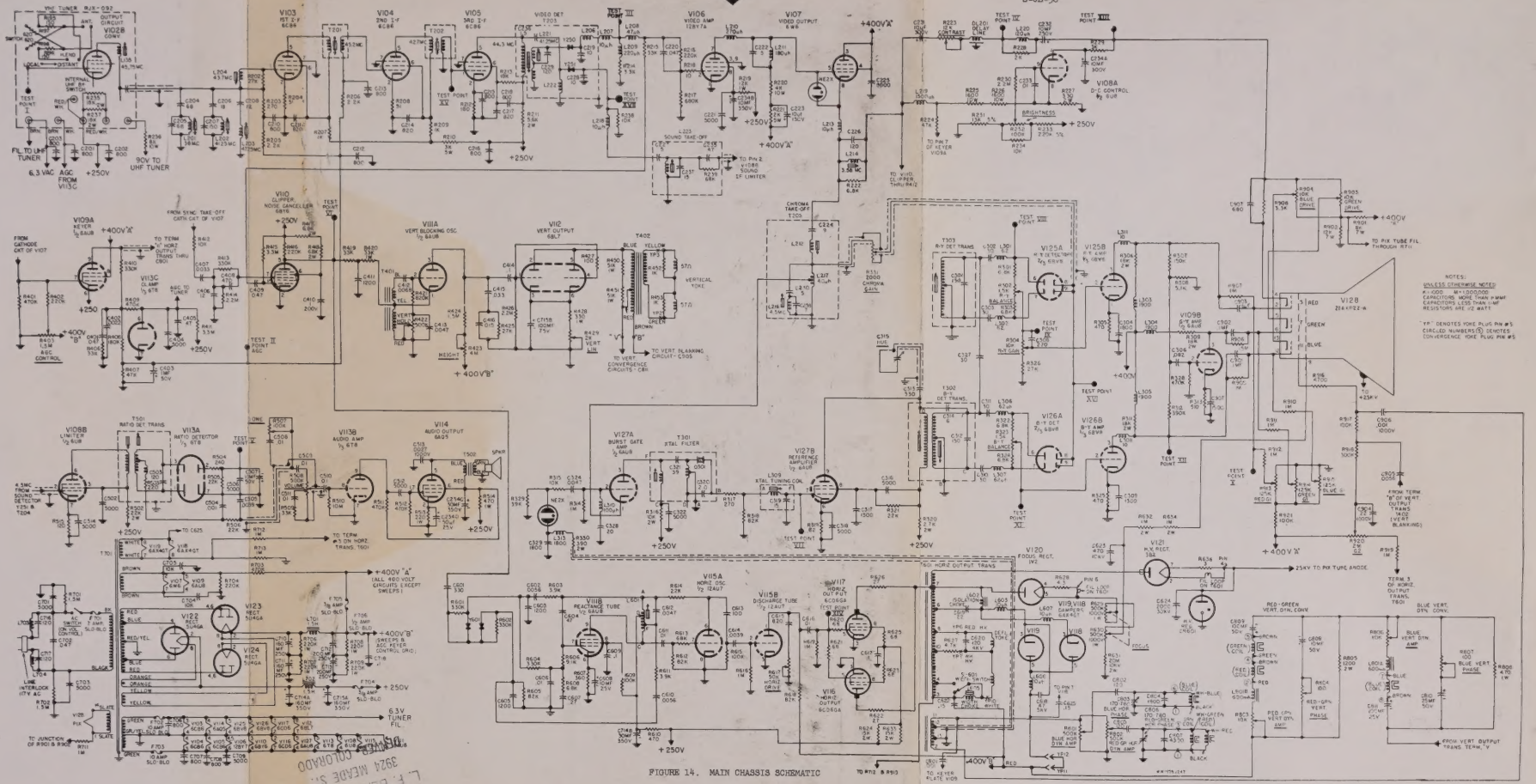


FIGURE 14. MAIN CHASSIS SCHEMATIC

SCHEMATIC COURTESY GENERAL ELECTRIC COMPANY

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